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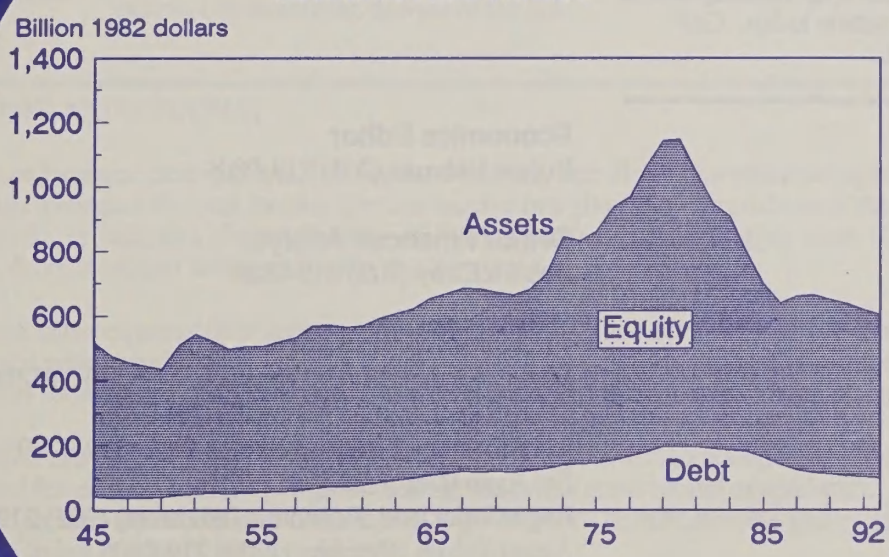
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December 1991

Agricultural Income and Finance

Situation and Outlook Report

Is Agriculture Returning To Historical
Levels in Real Terms?



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Agriculture and Rural Economy
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Summary

Farm Incomes in 1992: Recent Highs Difficult To Maintain

Nominal (current dollar) net cash and net farm incomes for 1991 and 1992, after rising each year from the mid-1980's through 1990, are forecast to return to 1988-89 levels. Lower livestock receipts, lower Government payments (in 1991), and continued higher expenses will leave net cash income at an estimated \$58 billion in 1991 and \$52-\$57 billion in 1992. Net farm income is forecast at \$44 billion in 1991 and \$40-\$46 billion in 1992.

Although these forecasts reverse the direction nominal incomes have taken lately, they still exceed all but those of just 2 or 3 years ago. When general inflation is considered, real cash incomes have eased downward for the past 4 years. However, real cash incomes remain above those of the early 1980's and on the same trend since the 1950's.

Grain Production Recovering

U.S. grain production is expected to increase in 1992 due to lower acreage reduction program (ARP) requirements for wheat and feed grains. The ARP requirement for wheat has been lowered to 5 percent. A preliminary 5-percent

ARP has been announced for feed grains, the lowest in 11 years.

Beef Production Rising, But Prices To Fall

Cash receipts from beef and pork production may decline slightly because increased output in 1992 will probably be more than offset by lower prices. Lower milk prices have reduced livestock receipts over the past year, but strengthening prices should raise dairy receipts a modest 2 percent or so in 1992.

1992 Receipts To Favor Crops Over Livestock

Total cash receipts reached a record \$170 billion in 1990—\$80.4 billion from crops and \$89.6 billion from livestock. In 1991 and 1992, however, receipts are forecast to fall 1 percent, due primarily to declines in the red meat and dairy subsectors. Crop receipts are expected to continue rising for 1991 and then hold steady.

Direct Government Payments May Stop Declining in 1992

Direct payments to farmers peaked at \$16.7 billion in 1987. For 1991 payments will total slightly more than \$8 billion, continuing the decline of the last

few years. However, for 1992, direct payments are forecast at \$9 to \$10 billion, up 10 to 13 percent from 1991. Most of the increase will come from cotton deficiency payments, which are expected to increase by about \$500 million. Food grain payments are also forecast up, although by a much smaller amount.

Production Expenses Still Climbing

Farmers' and ranchers' production expenses are forecast to increase 1 to 3 percent in 1992. Feed is the largest single cash expense, but lower prices will reduce feed expenses. Forecast higher prices for fuels and chemicals are likely to boost manufactured input expenses. Labor expenses—the third highest cash expense component—could rise nearly \$1 billion.

Farm Sector Wealth May Show Slight Nominal Rise

A continuing healthy level of farm income is likely to contribute to a nominal rise in farm sector wealth. However, in real terms, growth of assets and equity will be negative, lagging behind an expected 3-4 percent rate of inflation. About 60 percent of the equity lost during the farm financial crisis will have been recovered by 1992.

GLOSSARY OF FARM INCOME AND FINANCE

Net cash income—is the difference between cash receipts, farm related income, and direct Government payments and cash expenses. This cash-based concept measures the total income farmers receive in a given year, regardless of the year in which the marketed output was produced. It indicates the availability of funds to cover cash operating costs, finance capital investments and savings, service debts, maintain living standards, and pay taxes.

Net farm income—is the difference between gross farm income and total expenses. This accrual-based concept measures the profit or loss associated with a given year's production. Additions to inventories are treated as income. Nonmoney items such as depreciation, the consumption of farm-grown food, and the net imputed rental value of operator dwellings are included.

Net cash flow—is the sum of: gross cash income, the change in loans outstanding, net rent to nonoperator landlords, and the net change in farmers' currency and demand deposits; minus gross cash expenses and gross capital expenditures. This financial indicator measures cash available to farm operators and landlords in a given year. It indicates the ability to meet current obligations and provide for family living expenses, and to undertake investments.

Debt/asset ratio—measures both proportional owner equity in the farm and the financial risk exposure of the operation (the extent to which the farm's assets have been borrowed against). It is calculated as total debt outstanding as of January 1, divided by the farmer's estimate of the current market value of owned assets of the farm business.

Equity level—measures net worth. It is the hypothetical balance that would remain from the sale of assets and paying off existing debt. It is calculated as sector assets minus sector debt outstanding.

Incomes for 1992: Will Recent Highs Be Maintained?

Net incomes reached record levels in 1990. For 1991 and 1992, incomes are expected to fall somewhat, but remain healthy by historical measures.

Nominal net cash and net farm incomes for 1991 and 1992, after rising each year from the mid-1980's through 1990, are forecast to return to 1988-89 levels. Lower livestock receipts, lower Government payments (in 1991), and continued higher expenses will leave net cash income at an estimated \$58 billion in 1991 and \$52-\$57 billion in 1992. Net farm income is forecast at \$44 billion in 1991 and \$40-\$46 billion in 1992.

Although these forecasts reverse the direction nominal incomes have taken lately, they still exceed all but those of just 2 or 3 years ago. When general inflation is considered, real cash incomes have eased downward for the past 4 years. However, real cash incomes are still above those of the early 1980's and are following the same long-run trend since the 1950's.

Grain Production Recovering

Cash grain production is forecast to increase somewhat in 1992 after falling 10 percent in 1991. Wheat production fell nearly 28 percent in 1991 and corn was down 5 percent. Output of other major grains increased. Wheat should recover in 1992 and production of other cash grains (excluding soybeans) also should increase.

Prices for most cash grain crops were also down in calendar 1991, although rice was a notable exception. For 1992, wheat prices are forecast up slightly, with some decrease for the other grains.

Cotton production is forecast down slightly after increasing nearly 16 percent in 1991. Any lower prices associated with the higher 1991 production were offset by the larger crop.

Fruit and vegetable production is forecast up for 1992. Fruit prices are currently high, reflecting last December's freeze in California. Vegetable prices are forecast up slightly for 1992.

Beef Production Rising But Prices To Fall

Livestock receipts are likely to decline, as forecast increases in 1992 beef and pork production will probably be more than offset by lower prices. The low milk prices that have dominated livestock receipts over the past year are strengthening and should raise dairy receipts a modest 2 percent or so in 1992.

1992 Receipts Favor Crops Over Livestock

Total farm cash receipts reached a record \$170 billion in 1990—\$80.4 billion from crops and \$89.6 billion from livestock. For 1991 and 1992, however, receipts are forecast to fall 1 percent, due primarily to declines in the red meat and dairy subsectors. Crop receipts are expected to continue rising for 1991 and hold steady.

Wheat receipts fell in 1990 and 1991 as record 1990 world production caused prices to fall about \$1 per bushel. This past August, prices began rising due partly to lower 1991 production and stronger domestic use and exports. For 1992, the acreage reduction program (ARP) requirement for wheat has been lowered from 15 percent to 5 percent. This should raise production. With prices forecast steady to slightly higher, wheat receipts are forecast up 10-12 percent. However, this is still below the 1988-90 average.

Corn is the largest single U.S. crop in terms of receipts. A preliminary 5-percent ARP has been announced for 1992

feed grains, the lowest in 11 years. This should lead to higher production with a slight decrease in corn receipts. Given its importance to the agricultural sector, corn production has had a major impact on historical swings in farm incomes.

Other crop subsectors are holding steady or indicating slight receipt reductions. The notable exception is fruits and nuts, a commodity group representing many products. Last winter's freeze in California severely reduced fresh market supplies of oranges, causing prices to jump this past summer to two-and-a-half times their normal level. Although California's orange crop has recovered to near normal, storing export demand and a smaller Florida crop will keep orange prices higher than normal. Reduced grapefruit and lemon crops will maintain prices for other citrus.

Livestock receipts, including red meats and dairy, were record high in 1990. However, in 1991 and 1992, the red meat components are likely to experience falling receipts. Cattle and calves are forecast off 1 to 2 percent next year. With hog production forecast to be a record high, prices are expected to fall from a 1991 average of just under \$50 to a 1992 average in the low- to mid-\$40's, leaving hog receipts down 6 to 8 percent. Dairy product receipts are forecast to improve by some 2 percent in 1992 after a dropping 10 percent this year. Poultry receipts will be steady to slightly lower.

Direct Government Payments Trending Down

Direct payments to farmers peaked at \$16.7 billion in 1987. In 1991, they totaled slightly more than \$8 billion, continuing the decline of the last few years. However, for 1992, direct payments are forecast at \$9 to \$10 billion,

up 10 to 13 percent. Most of the increase will come from cotton deficiency payments, which are expected to rise some \$500 million. Food grain payments are also forecast up, although by a much smaller amount. Conservation program payments are forecast to rise from slightly less than \$2 billion in 1991 to just over \$2 billion. Not included in these 1991 and 1992 forecasts are any disaster payments that may occur. Some disaster payments were approved in Mid-December after this analysis was completed.

Production Expenses Still Climbing

Farmers' and ranchers' production expenses are forecast to increase 1-3 percent in 1992. Feed is the largest single cash expense. Corn and soybean meal prices are forecast to fall less than 1 percent, while prices for the other feeds are forecast down as much as 3 percent. The number of cattle placed on feed this past summer was off 16 percent from a year earlier and represented the lowest net placements since 1981. Fall quarter intentions are also forecast off from last year.

Fewer cattle placed on feed suggest that many heavy weight yearling cattle remain outside feedlots. When, and if, they enter feedlots next year at these heavy weights, they will be ready for

market in less time than usual, reducing feed demand. With the number of cattle on feed up only 1 percent next year and hog inventories constant, 1992 feed expenses (price times quantity) are forecast up, but by less than 1 percent.

Feeder livestock are the second largest expense. Feeder cattle prices for 1992 are forecast down 4-6 percent and feeder pig prices down 12-14 percent. These reductions will likely lower total 1992 feeder livestock expenses by around \$500 million.

Seed is another component of farm-origin inputs, but accounts for only 3 percent of total expenses. Seed expenses are forecast to rise 3-5 percent in 1992, due mainly to increased planted acreage and higher prices for hybrid corn and grain sorghum.

The manufactured inputs—fertilizer, fuels, electricity, and pesticides—each account for some 4-6 percent of total expenses. Forecast acreage increases for the major crops in 1992 are expected to raise demand for these production inputs. Prices for each are also forecast to be higher, which with increased use will raise expenses. Expense increases will range from 1 to 3 percent for fertilizers and pesticides to 4 to 6 percent for fuels and electricity. Total 1992 manufactured input expenses are forecast to rise nearly \$1 billion.

Interest costs played a major part in the financial crisis of the early 1980's. Since that time, through debt reduction and fiscal conservatism on the part of producers and their lenders, interest expenses have fallen, particularly for real estate. Total interest expenses (including operator dwellings) reached a high of \$21.8 billion in 1982, then fell each year through 1990. For this year and next, they are forecast to fall 1-2 percent.

Operating expenses—repairs, labor, custom work, transportation, etc.—are forecast to rise 3-7 percent. Due about equally to higher wage rates and increased demand from more crop acreage, labor expenses—the third highest cash expense component—could rise nearly \$1 billion, or 7 percent, in 1992. Repair costs, while only half the dollar amount of labor, are forecast up 5 percent.

Net farm income reflects both cash and non-cash components of income and expenses. Non-cash expenses have been rising for several years and are forecast to increase another 2-3 percent, or \$500 million, in 1992. Essentially all of this is due to higher capital consumption expenses, although non-cash perquisites to hired labor could rise marginally.

Farm Income Outlook—continued

Incomes Slipping Across All Regions and for All Farm Types

Net cash incomes for 1992 are forecast down slightly in each of the five major production regions. Even with slight receipt increases in the Northeast and West, higher expenses will prevail.

The falling net incomes of 1991 were felt in all regions but the Southeast. For 1992, current forecasts show declines in all regions. Cash receipt forecasts are mixed with higher 1992 crop receipts in the South and West and higher livestock and dairy receipts in the Northeast. However, these changes are very small and leave gross cash income unchanged

for the Northeast and Southeast, down about \$500 million for the Midwest, and up \$100 million for the South and \$300 million for the West.

Expenses Up Across All Regions

The small cash receipts improvements shown in the South and West will be

offset by rising input costs, especially for fuels and hired labor. The large fruit and vegetable industries in both these regions are very labor intensive and higher wage rates will boost labor costs. Energy prices are forecast up 4.5 percent for 1992. Irrigated areas, like the West, will be paying more to operate irrigation systems.

Cash Grain Farm Income Could Rise

While overall net cash incomes are forecast down 4 percent for crop farms and 6 percent for livestock farms, some farm types are expected to experience a slight increase. Cash grain farms (those with over 50 percent of the value of production coming from one or more of the cash grains) could see 1992 net cash incomes rise about 1 percent on average, led by wheat receipts.

The relative rise or fall in net cash incomes, however, will depend on the commodity mix. Farms specializing in wheat should see higher net incomes. Corn/soybean farms, on the other hand, will likely see lower incomes as prices ease downward (for corn), offsetting any increase in production. Cash grain farms with livestock will feel the effects of the weaker livestock subsector. Incomes for other major farm types are forecast to decline in 1992, except for dairy farms, which might realize an increase.

Reliability of Financial Forecasts

USDA's short-run farm income forecasts are based on an accounting model and are updated quarterly. The income forecasts in this report reflect conditions that were expected as of late November. The forecasts are based on final U.S. estimates (currently 1990), which are moved by quarterly prices and quantities forecast by USDA commodity analysts. These price and quantity forecasts are the same as those that were presented in the many commodity sessions at USDA's the annual *Agricultural Outlook Conference* held December 3-5. The resulting financial forecasts are revised each succeeding quarter until the final estimate is made approximately 18 months (six quarters) after the first forecast.

An error analysis over the past 8 years compared USDA's December Outlook Conference forecasts (those included in this report) and subsequent revisions over six quarters to the final estimates to determine the proportional differences by income component. Bottom-line net cash income was underestimated an average of 16 percent annually, ranging from \$2.1 billion to

Table 1--Regional cash incomes falling

Region	Cash receipts		Direct Government payments	Gross cash income	Cash expenses	Net cash income
	Crops	Livestock				
Million dollars						
1991F						
Northeast	4,518	7,106	126	12,158	7,992	4,166
Southeast	14,470	12,738	509	29,485	17,371	12,114
Midwest	29,809	37,146	4,734	73,959	54,572	19,387
South	9,221	13,555	1,643	25,532	17,820	7,712
West	24,802	14,662	1,447	42,267	27,760	14,507
1992F						
Northeast	4,511	7,121	134	12,168	8,234	3,934
Southeast	14,446	12,617	604	29,436	17,859	11,577
Midwest	29,615	36,614	4,933	73,384	55,778	17,606
South	9,233	13,346	2,083	25,768	18,214	7,554
West	24,973	14,496	1,646	42,444	28,558	13,886

F = forecast.

Table 2--Cash income and expenses for selected farm types

Farm type 1/	Gross cash income		Cash expenses		Net cash income	
	1991F	1992F	1991F	1992F	1991F	1992F
Billion dollars						
Cash grain	41.7	42.0	30.1	30.9	11.6	11.1
Cotton	6.4	6.4	2.9	3.0	3.6	3.4
Tobacco	2.8	2.8	2.3	2.4	.5	.4
Fruit/nut/vegetable	23.9	24.1	8.1	8.4	15.9	15.7
All crop farms	92.0	92.5	61.3	63.2	30.8	29.3
Red meat	54.2	53.5	43.2	43.9	11.0	9.6
Poultry and eggs	13.5	13.4	4.3	4.4	9.2	9.0
Dairy	21.9	22.3	17.6	17.9	4.4	4.3
All livestock farms	91.4	90.9	64.3	65.5	27.2	25.5

F = forecast. 1/ Farm types are defined as those with at least 50 percent of the value of production accounted for by a specified commodity group.

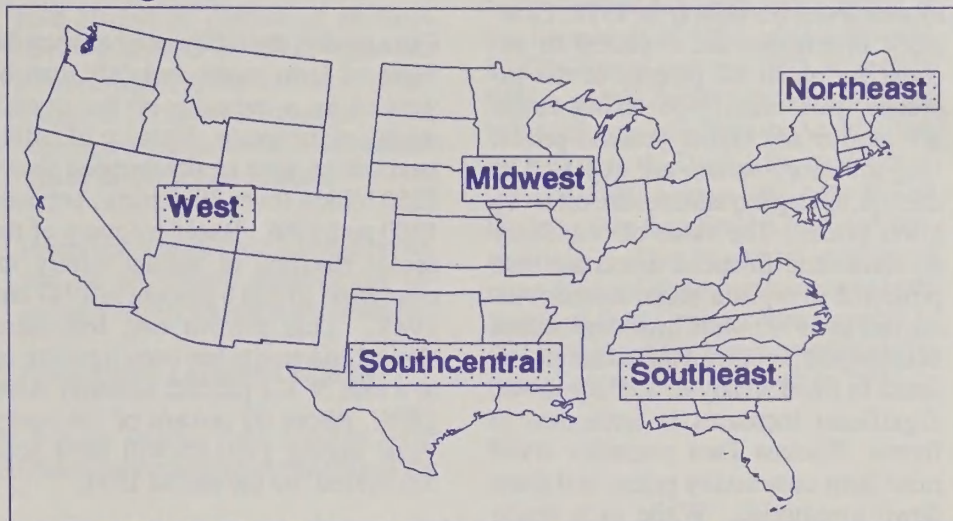
Table 3--Historical errors of USDA financial forecasts

	Variation from final estimates average 1983-90						
	Outlook Confrnc	1st qtr	2nd qtr	3rd qtr	4th qtr	5th qtr	6th qtr
	Percent						
Cash receipts	4	4	3	2	2	1	1
Crops	5	5	4	3	4	2	1
Livestock	5	4	3	1	1	2	1
Direct Gov't. payments	24	14	5	5	3	6	2
Farm related income	34	32	28	22	21	21	18
Gross cash income	5	4	3	2	2	2	1
Nonmoney income	20	19	16	13	11	11	10
Value of invty. change	115	78	62	59	56	80	57
Total gross income	4	4	3	3	3	2	1
Cash expenses	6	4	3	3	2	2	2
Total expenses	5	4	3	2	2	2	1
Net cash income-nominal	16	13	8	6	6	5	2
Net farm income-nominal	14	14	15	17	16	10	5

\$13.7 billion. Net farm income was off an average of 14 percent, being underestimated 6 of the 8 years. The major causes were a 24-percent error in forecasting direct payments, a 34-percent error in farm related income, and a 115-percent error in the value of the change in inventories (used in forecasting net farm income only).

Receipt and expense forecasts were much more reliable, with errors of only 4-5 percent, and were overestimated as often as underestimated. After four quarters, the forecasts of net cash income should improve to within 6 percent of the final estimate.

U.S. Regions



Balance Sheet Outlook

Limited Asset Growth and Stabilized Debt Levels

In nominal terms, wealth is increasing, but in real terms farm equity continues to decline.

Balance Sheet Reflects Farm Economy Stability

Farm income forecasts, taken with other projected financial performance indicators, point toward moderate growth in the farm economy in 1992. A continuing healthy level of farm income is likely to contribute to a nominal rise in farm sector wealth. While most farm income measures will again fall short of the record highs of 1990, these income indicators remain at levels that support a balance sheet outlook for limited asset growth, stabilized debt levels, and improving equity in a relatively stable farm economy in 1992.

Farm business assets, debt, and equity are each expected to rise 1-2 percent in 1992. While these moderate increases are indicative of the stabilizing farm economy, they are projected to lag a general price rise of 3-4 percent. As a result, real (1982\$) asset, debt, and equity levels are forecast to decline 2-3 percent. At the farm sector level, the slight drop in income and nearly imper-

ceptible loss in real wealth is not anticipated to create additional financial stress.

The economic performance of the farm sector will continue to be affected by the U.S. economy and international developments. Domestic macroeconomic policy and the performance of the U.S. economy will continue to be a major influence. Forecasts of general economic conditions suggest that real domestic GNP growth will be slow through the end of 1992. Internationally, the extent and nature of U.S. financial assistance to emerging USSR and East European countries may affect domestic commodity prices and inventory levels. Generally, an increase in assistance above current projections would have a positive influence on the U.S. farm sector.

Farm Asset Growth Negligible

The value of U.S. farm assets (excluding operator households) rose \$10 billion during 1991, an increase of 1.2

percent. Total assets are forecast to rise to \$850-\$860 billion in 1992, as the growth rate in asset values improves only slightly. Asset value growth has consistently ranged from 1 to 2 percent annually since 1988, which may reflect a long-run stabilization of the agricultural economy. The real value of farm assets is projected to decline in 1991 and in 1992, as the general rate of inflation is anticipated to exceed the growth in asset values.

Farm real estate assets increased slightly less than \$10 billion during 1991. This 2-percent rise in total farmland value suggests that relatively high cash incomes did not dramatically increase investors' expectations of long-run profitability of farming. Farmers also showed little desire to bid up land prices in attempting to expand operations. The projected income dip in 1992 should result in an even more modest land value appreciation rate of 0-2 percent.

Nonreal estate asset values are forecast to rise about \$5 billion in 1992. Live-stock inventories are expected to account for about 80 percent of the increase, due mainly to rising cattle inventories and higher yearend prices. Hog inventory values are expected to decline, as larger quantities are offset by lower prices. The value of machinery on farms and financial assets are also projected to register slight nominal increases in 1992, while inventory values of crops and purchased inputs are anticipated to trend steady to slightly lower. Significant increases in assistance to former Warsaw Pact countries could raise farm commodity prices and draw down inventories. While such action would bolster land prices and enhance current farm income, the impact on ending inventory values is not clear.

Farm Debt Stable

Total farm debt is anticipated to increase 1-2 percent during 1992. Debt is projected to increase less than 1 percent in 1991, significant only in that it will end a 6-year run of annual debt reductions. Stable land values and healthy cash income of farm borrowers are easing lenders' concern with loan defaults arising from land value declines. Farmers continue to show restraint in incurring debt to purchase land and replace machinery and equipment.

With debt levels generally lower than in the early 1980's, farmers appear to be in a better financial position to withstand 1992's projected income dip. When income fell during the early 1980's, farmers had substantially higher debt servicing needs.

The traditional institutional farm lenders, the Farm Credit System (FCS) and commercial banks, are restoring loan portfolio quality by recruiting of quality borrowers. Commercial bank lending should rise nearly \$2 billion in 1992, as banks report adequate credit availability for qualified borrowers. While the mix of Farm Credit System debt is expected to change over the course of 1992, the total debt outstanding is expected to end the year unchanged from 1991, as an increase in nonreal estate lending is projected to offset an anticipated decrease in FCS real estate debt.

Real Equity Decline Continues

Farm equity, the difference between the value of farm assets and debt, can be viewed as a measure of the overall wealth of the sector. Because of falling land values, farm equity dropped nearly \$250 billion (over 30 percent) between 1980 and 1986. Rapid recovery of the sector resulted in annual equity increases of 10 and 6 percent in 1987 and 1988. This growth rate has since slowed and equity has been trending up at a rate of 1-3 percent annually since 1988. About 60 percent of the equity 'loss' during 1980-86 will have been 'recovered' by the end of 1992.

While this trend is often interpreted as a sign that stability is returning to the sector, the recent rates of equity growth have trailed the general rate of inflation, which has averaged 3-4 percent during this same period. The result has been annual declines in the real value of farm equity since 1988, indicating slow erosion of the purchasing power of the farm sector's primary store of wealth.

Observed from a longer perspective, the farm sector balance sheet does not appear to have fully recovered from the financial crisis of the mid-1980's. Adjusted for inflation, farm sector equity at the end of 1992 will be slightly less than at the end of 1962.

The real value of farm assets has increased less than 2 percent during 1962-92. At the same time, real farm debt has increased over 17 percent. While the intensified capital requirements and elevated financial management awareness of farm operators can partially explain the relative increase in debt financing of U.S. farming, this less favorable debt-to-equity position suggests a more rigid, less flexible financial structure at the end of 1992 than that existing 30 years earlier.

Table 4--In 1992, real farm equity will return to 1962 levels after real farm equity and asset gains of the 1960's and 1970's were erased in the troubled 1980's

	Assets	Debt	Equity
	Percent change		
1962-80	94.0	132.5	87.6
1980-86	-44.5	-29.1	-47.6
1986-92	-5.5	-28.9	1.0
1962-92	1.7	17.1	-0.8

In real terms, farm equity has generally trended downward since peaking in 1980, including projected declines of over 2.5 percent in 1991 and in 1992.

- In real terms, farm sector equity at the end of 1992 is projected to be the second lowest of any year during 1962-92.
- Of the 10 lowest real farm equity levels recorded during 1962-92, 7 have occurred since 1984.

Farm Sector Returns

The farm sector is showing signs of continuing recovery, despite the gradual erosion of farm equity. Relatively high rates of return to farm equity and assets are expected to continue through 1992. The rate of return on equity from current income is expected to be 3-4 percent in 1992. Rates of return on equity and on assets are projected to continue the relatively favorable levels of recent years.

Other measures of financial performance suggest a stable to modestly improving farm sector during 1992. While 1992 cash income should allow adequate funds for debt servicing, the aggregate farm debt-to-asset ratio continues to improve. Returns to operators, a residual income measure for farm businesses, are expected to fall slightly.

Net cash income from farm operations (presented as "net cash available" in the graphs) is computed by adding interest expenditures to net cash income. This financial indicator measures the net cash income that is generated by the farm sector after it meets all non-interest cash production expenditures. It represents the cash income that would be available to the farm sector if it was debt-free and, therefore, interest expense-free.

In real terms, this measure has been relatively stable since the early 1950's. The portion of this available cash that was paid ~~an~~ interest to farm creditors rose from less than 16 percent in the early 1970's to almost 37 percent by the end of 1981. With the rapid drop in farm debt and interest expenses in the mid-1980's, this ratio fell to less than 20 percent by the end of 1988. It is anticipated to remain in the 18 to 20-percent range through 1992.

The relatively high net cash income generated by farm operations during the 1980's was depleted by the large proportion of that cash that was paid to creditors in interest payments. These indicators support the view that the economic stress of that period did not result from lower income, but from a changing financial structure that required a larger income share be distributed to creditors.

Entering 1992, reduced interest costs from net cash available suggest that, despite the gradual erosion of real farm equity, farmers are now better able to cope with the slightly lower net cash income.

Farm Lender Shares Change

Even though total farm business debt is forecast to increase slightly during 1992, the loan portfolios of individual lenders may change dramatically. The decrease in debt held by the Farmers Home Administration (FmHA) should be more than offset by increased loan volumes of other farm credit sources.

As FmHA continues to resolve its problem loan portfolio, FmHA farm debt could fall by another \$2 to \$3 billion in 1992. On June 30, 1991, over 40 percent of FmHA debt was owed by delinquent borrowers. Principal and interest payments delinquent more than 4 years totaled over \$5 billion.

In recent years, banks have gained market share through aggressive pursuit of limited risk, high quality mid- to large-scale farming operations. In the process, banks have lured away many of the Farm Credit System's most desirable borrowers. As FCS restructuring and recovery continue, the System is aggressively regaining market share.

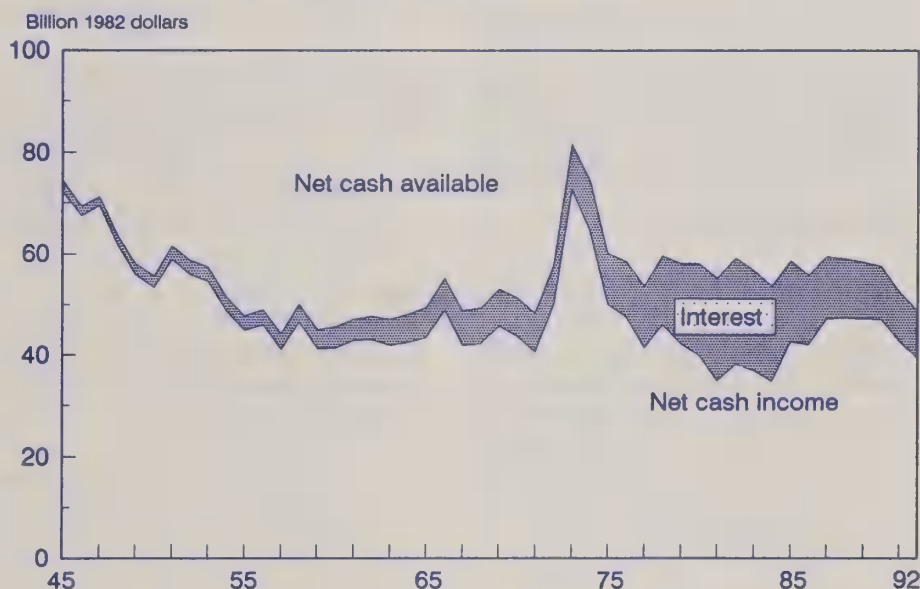
- Commercial banks are expected to hold almost 37 percent of all farm debt by the end of 1992, while the Farm Credit System's share is anticipated to be about 25 percent. This represents a reversal of 1984 market shares of these two lenders.
- Historical trends indicate that banks and the FCS have dramatically reversed market shares several times.

Lender Loan Losses Decline

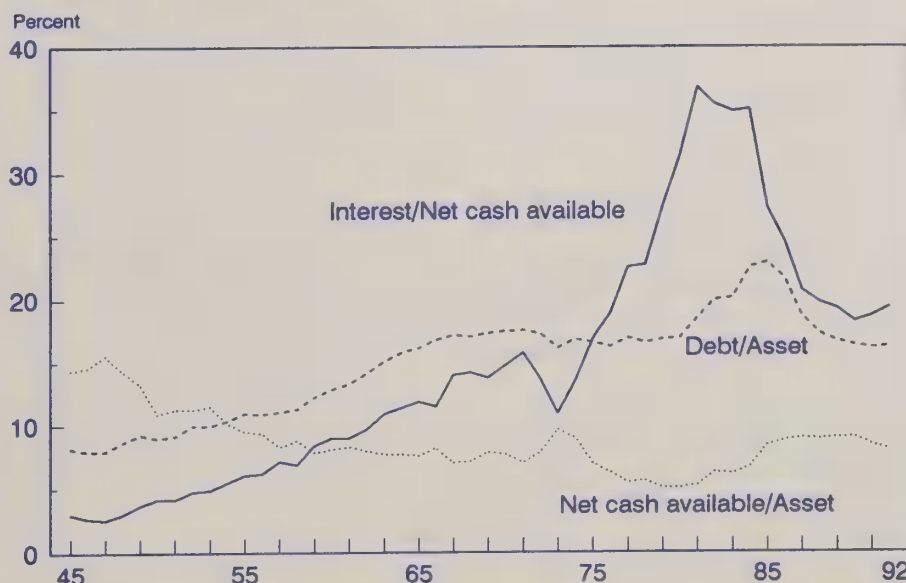
To a large extent, farm lenders were reluctant partners in the resolution of the

financial crisis of the 1980's. Farm business debt fell from \$193 billion at the beginning of 1985 to an estimated \$137 billion at yearend 1991. Over \$21 billion of this decline can be attributed to loan charge-offs taken by lenders during this period. During the recovery of the late 1980's, loan loss rates for all lenders other than FmHA declined substantially. The improved quality of most lenders' loan portfolios suggests that farm creditors will be better able to deal with those farmers most affected by the anticipated income drop in 1992.

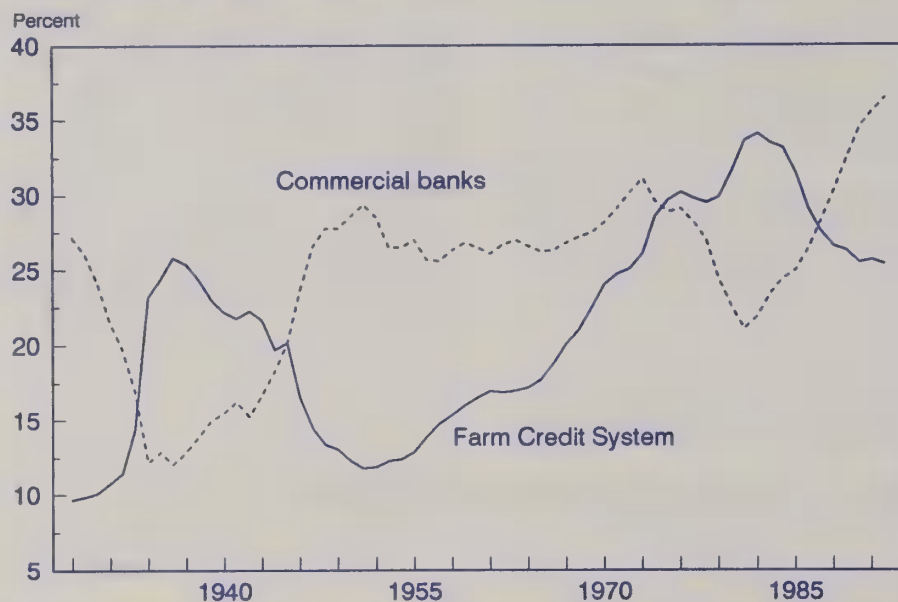
Net Cash Available Was High During 1980's, But Interest Payments Took A Larger Share



Interest Now Takes Less Available Cash Income, Other Financial Ratios Also Improve



Commercial Bank Market Share Gains Repeating Experience of 1940-50's Recovery



Lenders with the primary function of supplying credit to farmers appear to have been more adversely affected by these losses than lenders with more diversified portfolios.

- Estimated commercial bank loan losses totaled over \$5 billion during 1984-90. While these losses contributed to the rural bank failure rate, total bank farm debt increased almost \$1 billion during this period. Banks are expected to report net recoveries of previously written-off loans in both 1991 and 1992.
- Farm Credit System losses were almost \$4 billion during 1984-90.

However, FCS loans outstanding dropped almost \$30 billion, a decline of 46 percent. The System reported net recoveries in 1989. Recovery of past losses is expected to continue through 1992.

- Farmers Home Administration losses have increased dramatically in recent years, as it has begun to account for losses that had occurred in the early 1980's. By the end of 1992, FmHA losses (of principal and interest) may approach \$13 billion.

Conclusions: Recovery Slowed, Real Equity Eroding

Although all is not positive for the sector in 1992, the farm income decline in 1992 is anticipated to be much less severe than that of the 1980's. However, while it appears that farmers will make little financial progress in 1992, most will be able to avoid major setbacks.

Overall, the financial position of farmers entering 1992 appears to be continuing to erode gradually from the heights of the late 1970's. While increasing asset values and reduced debt loads have greatly lowered farmers' vulnerability to short-term fluctuations in income, the long-term impacts of declining real equity values cannot yet be determined.

Farmers and their lenders appear reluctant to respond to the relatively high incomes of recent years with renewed debt-financed expansion. A general inflation rate of 3 to 4 percent through the mid-1990's suggests continuing declines in real farm wealth as farm asset and equity growth rates fail to keep pace.

Politically resolved world trade and assistance issues may significantly change economic relationships in the 1990's. The market conditions emerging from trade reform and agreements can be expected to greatly affect the sector's financial performance and well-being.

The Self Employed: How Do Farmers Stack Up?

Wendell Holmes, Thomas Carlin, and Margaret Butler¹

Abstract: Persons with farm self employment earnings appear to have total incomes on par with persons with nonfarm self employment earnings. The total income of both groups exceeds that of persons with wage and salary earnings. However, the income of households with farm self employment earnings lags that of households with nonfarm self employment earnings. On the whole, farm household incomes are on par with those of households whose earnings are solely from wages and salaries. But households primarily dependent on farm earnings had the lowest incomes of all household groups with earnings.

Keywords: Farm business income, farm household income, nonfarm self employment earnings.

Recent research indicates that farm households have reached income parity with all U.S. households (Carlin and Deavers, Ahearn and El-Osta). While average incomes are similar, the distribution of farm household income is different from that of all U.S. households. Farm income, less than half of total farm household income, is more variable due to the business cycle and weather. Thus, farm households have a higher proportion of both low and high income households than is true for all U.S. households. If farmers, as a group, are no longer disadvantaged relative to the rest of society, then this affects public perception about the role of Government farm programs in redistributing income from the nonfarm to the farm sector.

Most farms are operated as sole proprietorship businesses. Farm proprietorships constitute about a quarter of all sole proprietorship businesses in the United States (Reimund and Gale). A more appropriate comparison of the relative income position of farm households may be with nonfarm proprietor households rather than all U.S. households because most households in the United States rely on wage and salary income for family living. This argument applies particularly when contrasting the wealth position of farm households relative to all U.S. households.

In order for farm households to earn an income comparable to the average for U.S. households, they must have a substantial investment in land and capital, either owned or controlled, because farming is a capital intensive industry. Wage earners, on the other hand, derive

most of their income from selling their labor services and their earnings are associated more with education and training than with ownership and control of capital.

Nonfarm self employed persons are a more appropriate benchmark for comparison because they, like farmers, rely on entrepreneurial skills to provide income for family living. This article examines the relative income position of persons and households with farm and nonfarm self employment earnings. Research also compares their incomes with persons and households whose earnings come solely from wages and salaries.

Approach

Research included the income and demographic characteristics of persons and households who reported receiving farm or/and nonfarm self employment income in 1989 using data from the March 1990 Current Population Survey (CPS) conducted by the Bureau of the Census. The CPS is the only national level survey that contains similar income information for persons and households with farm and nonfarm self employment income.

The primary purpose of the CPS is to obtain information on the U.S. labor force, thus there is only limited information about the nature of the self employed person's business enterprise. There is detailed information about persons in households, particularly for those persons who are at least 15 years old and most likely to be attached to the labor force.

The Census Bureau interviewed about 57,000 households located in 729 sample areas that comprised 1,973 counties and independent cities. These households contained about 114,500 persons of labor force age, 15 years old and over, and approximately 33,500 children 0-14 years old. The sample is representative of the civilian noninstitutional population of the United States.

Persons with Self Employment Income

About 14.2 million persons of labor force age earned self employment income, either farm or nonfarm, during 1989 (table A-1). This represented about 7.9 percent of all persons at least 15 years old in the United States. About 1.9 million had farm self employment income and 12.5 million had nonfarm self employment income. About 184,000 persons reported receiving both farm and nonfarm self employment income (data for this group are not shown).

The demographic characteristics of persons with self employment income differ from those of all persons and persons whose earnings are solely from wages and salaries. Persons with self employment income are more likely to be white and male. Those in the farm group are more likely to have these characteristics than are those with nonfarm self employment income. Almost two-thirds of persons with self employment income are in the 35- to 64- year age range, much higher than for the general population and persons with only wage and salary earnings. Persons with nonfarm self employment income are more likely to have some college education

than are all persons or persons with wage and salary income. However, this is not true for the farm group whose education levels were similar to those for all persons.

The median total income of all persons with farm or nonfarm self employment income exceeds that of all persons and persons with only wage and salary earnings (table A-2). The difference in median total income between all persons with nonfarm self employment income and all persons with farm self employment income was not significant.

Off-farm income was an important part of the total income of farmers and their households (Carlin and Deavers, Ahearn and El-osta, Reimund and Brooks). This was also confirmed by the CPS data. In general, farm self employment income was about 38 percent of total income for the farm group. Persons with nonfarm self employment income relied more on their business earnings. About 60 percent of their total income came from a nonfarm business. However, persons with nonfarm self employment income also have significant income from sources other than self employment earnings.

About 28 percent of the income of persons with nonfarm self employment income is from wage and salary work. Wage and salary income is more important to persons with farm self employ-

Table A-1--Selected characteristics of persons 15 years and older

	All persons	Persons with earnings and no self employment income	Persons with self employment income from:	
			Nonfarm business	Farm business
Number (1,000)	178,852	119,169	12,494	1,905
	Percent			
Race:				
White	86.0	85.4	92.0	97.6
Black	10.8	11.3	4.7	1.6
Other	3.1	3.3	3.3	0.8
Sex:				
Male	48.9	52.5	64.0	83.5
Female	51.1	47.5	36.0	16.5
Age:				
15-24 years	15.8	20.4	5.4	3.8
25-34 years	23.1	28.6	24.1	17.9
35-64 years	44.8	47.8	64.0	63.9
65 and over	16.4	3.1	6.6	14.3
Education:				
Less than high school	23.7	17.9	13.9	18.3
High school	37.8	39.2	35.1	44.7
Some college	19.0	21.1	21.3	16.7
College graduate	19.5	21.8	29.8	20.4

Source: Special tabulations from the March 1990 Current Population Survey.

ment income, and accounts for 39 percent of the farm group's total income. In general, persons with self employment income are less dependent on passive income, (for example, income from dividends, interest, or rent) than are all persons.²

Dependence On Self Employment Income

A large proportion of all U.S. farms are operated on a part-time basis. For example, 45 percent of all farm operators in 1987 reported that farming was not

their primary occupation (1987 Census of Agriculture). Slightly over half of all farm households were highly dependent on off-farm income in 1986 (Reimund and Brooks).

Analysis of the CPS data gave similar results for persons with farm self employment income. Fifty-one percent were primarily dependent on income other than from farming.³ Wages and salaries were the largest income source for these persons. The median income of those who were not primarily dependent on farm self employment income

Table A-2--Selected characteristics of persons 15 years and older

Item	All persons	Persons with earnings and no self employment income	Persons with self employment income from:					
			Nonfarm business			Farm business		
			All	Primary	Not primary	All	Primary	Not primary
Number (1,000)	178,852	119,169	12,494	7,676	4,818	1,905	934	972
	Dollars							
Average mean income from:								
Wages and salaries	13,867	19,913	7,239	555	17,185	9,500	1,241	17,436
Dividends, interest, & rent	1,345	845	1,724	1,113	2,697	2,417	1,106	3,676
Nonfarm self employment	1,094	-	15,658	23,360	3,388	1,473	2,761	236
Farm self employment	97	-	90	121	40	9,134	16,426	2,070
Other	2,505	2,709	1,450	465	3,123	1,689	646	2,691
Total	18,908	21,777	26,161	25,614	27,033	24,213	22,240	26,109
	Percent							
Total personal income of:								
Less than \$10,000	39.0	28.5	30.0	31.1	28.1	23.9	27.8	20.1
\$10,000 - \$14,999	13.8	14.2	12.0	12.2	11.8	15.9	16.4	15.5
\$15,000 - \$24,999	20.2	23.9	19.2	18.9	19.8	21.5	21.8	21.1
\$25,000 - \$49,999	20.8	26.2	24.4	22.7	27.1	29.0	24.2	33.5
\$50,000 or more	6.2	7.0	14.1	15.0	13.4	9.7	9.8	9.9
	Dollars							
Median income	13,984	18,054	18,999	18,380	19,950	19,902	17,520	22,160

Source: Special tabulations from the March 1990 Current Population Survey.

was significantly higher than for those persons who were dependent on farm self employment income. Persons whose farm self employment earnings were their primary income source came the closest to mirroring the incomes of wage and salary workers. That farm group's median income was not significantly different from that of wage and salary workers.

Persons with nonfarm self employment income were not always dependent on their self employment earnings either. About 39 percent depended more on income other than nonfarm self employment earnings, primarily wage and salary income. The median income of those who were not primarily dependent on nonfarm self employment income was significantly higher than for those persons who were dependent on nonfarm self employment income. The median income of persons primarily dependent on nonfarm self employment income was the same as that of persons with wage and salary income.

Finally, the median income of those persons for whom farm self employment was not their primary income source was not significantly different from that for the similar nonfarm self employment group.

Households with Self Employment Income⁴

While persons with farm self employment earnings have incomes on par with their nonfarm counterparts, households with farm self employment earnings have lower median incomes than do households with nonfarm self employment earnings (table A-3). Still, average incomes of the farm group exceed those of all U.S. households but are not significantly different from those of households, whose only earnings were from wages and salaries.

A higher proportion of households with nonfarm self employment income rely primarily on those earnings for family living than is true for households with farm earnings. About 30 percent of the farm household group earn more than half their income from farm self employment. About 37 percent of households with nonfarm self employment income had more than half of their total income coming from nonfarm business earnings.

Also, the median income for those dependent on nonfarm business earnings exceeds that of those dependent on farm business earnings. This is due largely to the substantial difference in average self employment earnings between the two groups. Understanding the differences in business earnings between the farm

and nonfarm groups requires information about the nature of proprietorship businesses for which the CPS data offer little insight. While it has long been recognized that a large proportion of farms are small businesses, other research suggests that it is also true for nonfarm proprietorship businesses (Reimund and Brooks).

For those households where self employment income is not the primary income source, wage and salary income is significantly lower for the farm group than for the nonfarm group. Differences in the number of workers per household and the types of jobs held by earners can influence relative household wage and salary income between groups. For example, nonfarm proprietors are much more likely to live in metropolitan areas than are farm proprietors, and earnings per job are substantially higher in metropolitan areas. Thus, members of nonfarm proprietor households have more access to higher paying jobs than is true for persons in farm proprietor households. These differences will be examined in more detail in future research.

Clearly, those households primarily dependent on farm self employment earnings had the lowest average incomes among the four self employment groups and their average incomes were well

Table A-3--Selected characteristics of households

Item	All households	Households with earnings and no self employment income	Households with self employment income from:					
			Nonfarm business			Farm business		
			All	Primary	Not primary	All	Primary	Not primary
Number (1,000)	93,347	61,518	10,916	4,035	6,881	1,685	509	1,176
Dollars								
Average annual income from:								
Wages and salaries	26,146	33,163	22,818	5,953	32,706	19,757	4,710	26,269
Dividends, interest, & rent	2,561	1,936	3,151	2,353	3,618	4,161	1,779	5,193
Nonfarm self employment	2,074	-	17,738	36,724	6,605	2,398	451	3,240
Farm self employment	184	-	217	13	337	10,207	25,692	3,506
Other	4,730	2,967	3,082	1,238	4,166	3,120	1,342	3,888
Total	35,695	40,066	47,006	46,281	47,432	39,643	33,974	42,096
Percent								
Total personal income of:								
Less than \$10,000	15.6	7.4	7.4	9.0	6.4	8.9	11.3	7.9
\$10,000 - \$14,999	9.7	7.7	6.6	7.4	6.2	7.4	9.2	6.6
\$15,000 - \$24,999	17.9	18.1	15.0	16.9	14.1	17.4	20.8	16.0
\$25,000 - \$49,999	33.1	39.1	35.7	32.1	37.7	40.4	39.4	40.6
\$50,000 or more	23.7	27.9	35.5	34.5	35.8	26.0	19.4	29.1
Dollars								
Median income	30,135	35,741	39,705	38,005	40,450	35,086	30,520	37,006

Source: Special tabulations from the March 1990 Current Population Survey.

below households with only wages and salaries as earnings.

Implications

The research reported above was undertaken in response to concerns about the appropriate nonfarm group to use in assessing the relative income position of farm operator households. This analysis suggests that persons with farm earnings appear to have total incomes on par with their nonfarm counterparts. Both groups have average incomes that exceed that of all persons of labor force age and persons whose sole earnings were from wages and salaries. But the total income of households with farm earnings trails somewhat those with nonfarm self employment earnings although they do exceed the average total income of all U.S. households. The farm group, as a whole, has total incomes on par with households whose earnings are from wages and salaries only. While the average incomes of households primarily dependent on farming match those of all households, they trail the average incomes of the wage and salary group.

The composition of incomes differs between the two groups of households with business earnings as well as the extent to which the groups "depend" on their respective self employment earn-

ings. Using CPS data alone limits the examination of some differences. However, the findings suggest that part of the income differences between the two groups of households with self employment income is likely associated with factors other than the nature of the self employment business. For example, second earners in the households with nonfarm self employment income may have access to better paying jobs than is true for the farm group, thus contributing to higher household incomes. Federal farm policies can do little to alter basic structural differences between metropolitan and most non-metropolitan labor markets.

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² Other income includes Social Security and other retirement income, and transfer income such as unemployment compensation, worker's compensation payments, Supplemental Security Income, and veteran's payments.

³ Households are the basic social unit in our society. They are made up of individuals who share a housing unit and typically pool resources to meet living expenses. About 70 percent are families; the rest are individuals living alone or households composed of unrelated individuals living together.

⁴ Self employment was considered to be the primary source of income if it exceeded 50 percent of total income.

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Why U.S. Farm Income Is Record High

Roger Strickland and Cheryl Johnson¹

Abstract: An analysis of farm income in the late 1980's is presented. The farm sector's financial crisis was really a balance sheet crisis and not an earnings crisis. The farm economy in recent years compares favorably with its best performances over the last several decades.

Keywords: Farm income, farm crisis, economic indicators

Economic indicators for 1986-90 suggest that the U.S. farm sector has not only overcome the severe financial crisis experienced in the mid-1980's but is reaping the benefits of a sound farm economy that compares favorably with its best performances over the last several decades. Expressed in current dollars, both net farm income and net cash income, the USDA's two income series most frequently used as measures of farmers' earnings, have attained new highs for 4 consecutive years (table B-1).^{2/} In 1987 and 1989, farm income made substantial gains to new highs, and then in the subsequent year, maintained and consolidated these advances, resulting in small gains. When adjusted for inflation, farmers' earnings compare favorably with those of the last several decades, but are not exceptional.

The gains in income are real. They are based on strong fundamentals of supply and demand, resulting in higher prices received by farmers for the products they produce and sell. The prices are the consequence of a broad-based improvement in market conditions, where disposition has exceeded supply, causing the inventories of numerous major commodities to fall and remain low. Scarcity has produced large, sustained upward moves in market prices.

With the improvement in market conditions experienced by farmers, the reliance of the farm economy on governmental assistance has declined significantly. Direct payments from the Federal Government to farmers have fallen by 44 percent from the record high \$16.7 billion of 1987. Similarly, the payments have also declined as a proportion of net farm income, representing only an 18-percent share in 1990, in contrast to a 42-percent share in 1987 (table B-1).

The Decline in the Cattle Herd

The number of cattle in the United States peaked at 132 million in 1975, which coincided with increasing public awareness about the relationship between consumption of animal fat and diseases of the human cardiovascular system. For much of 1976-1990, consumers' concerns about red meat in their diet and the abundance of cattle exerted downward pressure on beef prices, which made beef production less profitable and provided disincentives to producers. The result was a 15-year decline in the cattle herd, which left the number at 98 million in 1990, down 25 percent (table B-2).

Despite the decline in the cattle herd, meat production ranged consistently from 37 billion pounds to 40 billion pounds from 1975 to 1990. This reflects the addition to slaughter of cattle that might otherwise have been retained as replacements in maintaining the herd size. Broiler production rose continuously over this same period to more than offset declines in red meat production. In actuality, the production of 23 billion pounds of beef in 1990 was only slightly lower than the 24 billion pounds in 1975. The gradual liquidation of the cattle herd has served to mitigate the effects of declining cattle production on beef production.

The pressure of competition from poultry, with its lower fat content, has affected cattle production in ways other than just herd size. Emphasis has shifted to producing leaner beef. Competitive forces reward efforts to become cost effective with fewer, larger, and more efficient feedlots and more attention to factors that affect costs of producing weight gains in cattle.

As the number of cattle continued to decline over the past 15 years, the price

of Choice steers trended up from \$45 per hundredweight in 1975 to \$65 in 1987 to \$77 in 1990. In 1987-90, the prices of steers were in the range of \$65-\$77, high by historical standards. Prices at these levels could be expected to make cattle production profitable. Sales from cattle and calves in 1990 were \$39.7 billion, 23.3 percent of total U.S. cash receipts, and double the receipts from the next largest commodity. Historically, high cattle prices would not only be consistent with record high income but a major contributor.

Pork, a substitute for beef in consumers' diets, experiences increases in demand as the price of beef rises. Hogs have a much shorter production cycle than cattle, so as pork/hog prices rise in response to the shift in demand, production increases and prices often retreat in a year or two. Hog prices were not only relatively high in 1987 and 1990 at levels above \$50 per hundredweight but the hog-corn price ratio was favorable, reaching an extraordinary high level of 33.6 in 1987, thus indicating exceptional profitability. Hogs rank fourth in sales among the leading commodities.

The Decline in Crop Inventories

For any crop, inventories are a major component of the supply available for sale, and as such, are a key determinant of market price. A drop in inventories translates directly into a reduction in supplies available to meet the demand in the immediate future and serves to improve market fundamentals for producers.

The inventories of the major field crops fell substantially during 1987 to 1991 (table B-3). The inventories of corn, sorghum, and wheat were each down more than 70 percent at some point during this period and remained near their lowest level in 1991. Likewise, rice and

Table B-1--U.S. farm income indicators with year-to-year changes, 1986-90

Item	Billion dollars					Change 1986-1987		Change 1987-1988		Change 1988-1989		Change 1989-1990	
	1986	1987	1988	1989	1990	Bil. \$	%	Bil. \$	%	Bil. \$	%	Bil. \$	%
Gross farm income 1/	156.1	168.4	174.5	190.3	195.1	12.3	7.9	6.1	3.6	15.8	9.1	4.8	2.5
Cash income	152.3	165.1	171.9	179.9	186.0	12.8	8.4	6.8	4.1	6.1	3.4	6.1	3.4
Farm marketings	155.7	167.8	173.5	189.9	194.0	12.1	7.8	6.0	4.0	4.1	3.4	4.1	3.4
Crops	63.7	65.8	71.6	76.8	80.9	2.1	3.3	5.2	7.8	6.8	5.2	6.8	5.2
Livestock and products	71.6	76.0	79.1	84.1	89.1	4.4	6.1	5.0	6.1	7.2	8.6	5.0	5.7
Government payments	11.8	16.7	14.5	10.9	9.6	-4.9	-41.5	-2.2	-13.8	-12.6	-24.8	-17.3	-14.5
Other farm income	1.2	1.5	1.3	1.5	1.6	0.3	22.7	-0.2	-0.2	1.3	27.9	-1.4	-1.6
Machine hire/customwork	1.2	1.5	1.3	1.5	1.6	0.3	22.7	-0.2	-0.2	1.3	27.9	-1.4	-1.6
Other farm-related income 2/	5.5	5.1	6.1	6.1	6.3	-0.4	-7.3	0.2	3.1	5.0	30.4	1.5	2.5
Noncash income	5.0	5.1	6.1	6.1	6.3	-0.1	-1.7	0.2	3.1	5.0	30.4	1.5	2.5
Value of home consumption	4.6	4.9	5.4	5.4	5.6	0.3	6.5	-0.5	-1.1	-1.1	-8.8	-0.1	-1.7
Rental value of dwellings	4.6	4.9	5.4	5.4	5.6	0.3	6.5	-0.5	-1.1	-1.1	-8.8	-0.1	-1.7
Value of inventory adjustment	-2.2	-2.3	-3.5	4.3	5.9	-1.1	-47.7	1.2	9.6	7.8	1.8	-1.4	1.7
Total production expenses 1/	125.1	128.7	133.9	140.2	144.3	3.6	2.9	5.1	4.0	4.1	3.4	4.1	3.4
Intermediate product expenses	70.6	74.9	79.4	83.7	85.0	4.3	6.1	4.5	4.3	4.1	3.4	4.1	3.4
Farm origin	17.5	17.5	20.0	21.0	20.7	3.0	17.1	1.2	1.0	1.0	5.7	2.6	2.3
Feed purchased	9.8	11.8	12.8	13.1	14.7	2.0	20.4	0.3	0.3	1.6	12.0	1.6	1.6
Livestock and poultry purchased	2.2	3.1	3.4	3.6	3.8	0.9	40.9	0.2	0.2	0.2	5.4	1.1	1.1
Seed purchased	18.2	18.1	18.0	19.7	20.7	1.5	8.3	1.7	1.7	1.7	9.1	5.0	5.3
Manufactured inputs	6.4	6.5	6.6	6.5	6.7	0.1	1.5	-0.1	-0.1	-0.1	0.2	0.3	0.3
Fertilizer and lime	1.3	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pesticides	5.1	5.2	5.3	5.2	5.4	0.1	2.0	-0.1	-0.1	-0.1	0.2	0.3	0.3
Fuel and oil	1.8	1.8	1.8	1.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	1.3	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	21.9	24.6	24.0	26.5	26.1	2.7	12.3	-0.4	-0.4	2.0	7.5	-0.4	-1.5
Repair and maintenance	6.4	6.5	6.6	6.5	6.7	0.1	1.5	-0.1	-0.1	0.2	0.2	0.3	0.3
Other miscellaneous 3/	15.5	18.1	17.4	19.9	19.4	2.6	16.8	2.5	2.5	2.0	11.1	3.0	3.0
Interest	16.3	17.5	17.2	19.2	18.8	1.2	7.3	-0.3	-0.3	2.0	11.1	4.2	4.2
Real estate	9.1	9.4	9.8	11.1	11.5	0.3	3.3	1.3	1.3	1.3	1.3	1.3	1.3
Nonreal estate	7.2	8.1	7.4	8.1	7.3	0.9	12.5	-0.7	-0.7	0.7	8.8	-0.8	-0.7
Contract and hired labor expenses	9.0	10.0	10.4	10.6	12.0	1.0	11.1	0.2	0.2	1.4	13.2	1.4	1.4
Cash labor expenses 4/	9.0	10.0	10.4	10.6	12.0	1.0	11.1	0.2	0.2	1.4	13.2	1.4	1.4
Perquisites	6.1	7.3	7.4	7.9	8.2	1.2	19.8	-0.1	-0.1	0.5	6.3	0.3	0.3
Net rent to nonoperator landlords	17.8	16.7	17.1	17.6	17.5	-1.1	-6.2	0.5	2.9	-0.1	-0.1	-0.1	-0.1
Capital consumption	4.6	4.9	4.8	5.1	5.6	0.3	6.5	-0.3	-0.3	0.5	8.8	0.5	0.7
Property taxes	31.0	39.7	40.6	50.1	50.8	8.7	28.0	9.5	2.3	23.4	8.8	0.5	0.7
NET FARM INCOME	152.8	165.1	171.9	179.9	186.0	12.3	8.0	6.8	4.1	6.1	3.4	6.1	3.4
Cash income 5/	105.0	109.8	114.5	120.5	124.2	4.8	4.6	4.7	4.3	6.0	5.2	3.7	3.1
Cash expenses 5/	70.0	74.2	78.6	83.2	85.1	-4.2	-6.0	-3.5	-2.1	-4.6	-5.8	-2.0	-2.5
Intermediate product expenses	15.7	14.5	14.2	14.2	13.8	-1.2	-7.8	-0.3	-0.4	-0.0	0.0	-0.4	-0.4
Interest	9.0	9.5	10.0	10.6	12.0	0.5	5.6	0.6	5.1	7.2	6.9	1.4	1.4
Cash labor expenses 4/	6.1	7.3	7.4	7.9	8.2	1.2	19.8	-0.1	-0.1	0.5	6.3	0.3	0.3
Net rent to nonoperator landlords	4.2	4.3	4.3	4.5	5.0	0.1	2.4	-0.2	-0.2	0.2	5.3	0.4	0.4
Property taxes	47.8	55.3	57.4	59.4	61.8	7.5	15.7	2.1	3.7	2.0	3.5	2.4	4.0
NET CASH INCOME	47.8	55.3	57.4	59.4	61.8	7.5	15.7	2.1	3.7	2.0	3.5	2.4	4.0

Source: Economic Indicators, National Financial Summary, 1990, USDA Economic Research Service. --- = Not applicable. 1/ Includes operator dwellings. 2/ Includes forest product sales, custom feeding services, and other farm business-related income. 3/ Includes machine hire and customwork expenses; marketing, storage, and transportation expenses; and miscellaneous expenses. 4/ Includes contract labor expenses, hired labor wages, and Social Security payments. 5/ Excludes operator dwellings.

Table B-2--U.S. livestock statistics, 1975-1990

Year	Inventory of cattle & calves Jan., 1	Price of choice steers 1/	Inventory of hogs & pigs Dec., 1	Price of barrows & gilts 2/	Hog-corn price ratio
	1,000	\$/cwt.	1,000	\$/cwt.	Ratio
1975	132,028	44.61	49,267	48.32	17.1
1976	127,980	39.11	54,934	43.11	17.5
1977	122,810	40.38	56,539	41.07	19.8
1978	116,375	52.34	60,356	48.49	22.4
1979	110,864	67.67	67,318	42.06	18.3
1980	111,242	67.05	64,462	39.48	14.4
1981	114,351	63.84	58,698	44.05	14.9
1982	115,444	64.22	54,534	55.07	23.0
1983	115,001	62.52	54,694	47.33	15.8
1984	113,360	65.34	54,073	48.69	15.4
1985	109,582	58.37	52,314	44.50	17.6
1986	105,378	57.74	51,001	50.59	26.1
1987	102,118	64.60	54,384	51.04	33.6
1988	99,622	69.54	55,469	43.39	19.9
1989	98,065	72.52	53,821	44.03	17.4
1990	98,162	77.40	54,362	54.45	22.5

Sources: For statistics prior to 1988, the Agricultural Statistics, 1990, USDA is referenced. For years 1988-90, Meat Animals Production, Disposition, and Income is referenced for inventory data; Agricultural Outlook, September, 1991, USDA, ERS is referenced for prices; and for the hog/corn ratio, Agricultural Prices, 1990 Summary, June, 1991, USDA, ERS.

1/ USDA series reported prices from Omaha. 2/ USDA series reported prices from seven markets (Indianapolis, Kansas, Omaha, National Stock Yards, Sioux City, South St. Joseph, and South St. Paul).

Table B-3--End of marketing year stocks for major U.S. crops, 1987-91

Year	Corn	Sorghum	Wheat	Rice	Soybeans	Cotton 1/
	Mil. bu.	Mil. bu.	Mil. bu.	Mil. cwt	Mil. bu.	Mil. bales
1986/87	4,882	743	1,821	51.4	436	5.0
1987/88	4,259	663	1,261	31.4	302	5.8
1988/89	1,930	440	1,702	26.7	182	7.1
1989/90	1,344	220	536	26.3	239	3.0
1990/91	1,530	157	866	26.2	325	2.2

Source: Agricultural Outlook, September 1991, USDA, Econ. Res. Ser.

1/ Upland and extra long staple.

cotton were down 50 percent or more by the end of the period, and soybeans were down 25 percent in 1991, after having been off as much as 58 percent at one point.

Because falling inventories contribute to lower supplies and improved market fundamentals for producers, it is not surprising that five of the six major field crops shown in tables B-3 and B-4 experienced price increases of more than 50 percent during this period. Prices for cotton, the one exception, were still up a respectable 29 percent. Sorghum and rice prices rose as much as 85 and 96 percent, respectively. High market prices benefit producers directly, and price increases of these magnitudes add substantially to the "bottom line," as reflected in the net income measures.

1987: Government Payments and Livestock Prices

Net farm income rose \$8.7 billion in 1987, fueled by a \$4.9-billion jump in Government payments to an alltime re-

cord high of \$16.7 billion. A \$4.4 billion rise in receipts from the sale of livestock was another major contributor to the 28-percent gain in farm income. The increase in both cattle and hog receipts resulted directly from improvements in market conditions, as cattle prices rose more than 10 percent for the year and the hog-corn price ratio reached a lofty 33.

Crop receipts were also up \$2 billion, reflecting higher prices, but higher grain prices also mean higher feed costs for producers of livestock. As a result, from the sector's perspective, the gain in crop receipts was offset by the \$2.1-billion jump in expenditures for purchased feed.

In 1987, the \$8.7-billion rise in net farm income was due primarily to the combined \$9.3-billion addition to gross farm income from Government payments and livestock sales at higher prices (table B-1). Increases in expense items other than feed, offset a little of the jump in gross income. The increase

in net cash income was \$1.2 billion less than that of net farm income, because a reduction of \$1 billion in capital consumption charges contributed a like amount to the increase in net farm income but had no effect on net cash income. Capital consumption is an accounting of the reduction in value of capital assets having a useful life of more than 1 year. It consists of depreciation and losses from accidental damage, both of which are noncash accounting entries to expenses.

1988: Major Drought in Corn-Belt States

In 1988, a severe drought occurred in the major corn producing States of the Midwest. Yields of spring-planted crops were particularly hard hit in the Corn Belt. For example, corn yields in Illinois and Iowa, the two leading producing States, dropped 45 percent and 35 percent, respectively. In total, corn production was down 2.2 billion bushels (31 percent), and three States (Iowa, Indiana, and Indiana) accounted for 1.2 billion bushels of the decline. Corn is the leading crop in sales receipts despite the fact that 25 percent of the production is fed on the farm where produced and never enters the market. Corn is the third ranked commodity in sales, exceeded only by cattle and dairy products.

Farmers began the year with sizable stocks of corn, sorghum, wheat, and soybeans, which they liquidated to reap the benefits of higher market prices that emerged as the severity of the drought became apparent. Because the drought was confined to a few States, farmers in the other States experienced little effect on yields and had all of their normal production to sell at the higher prices, thus getting a double boost from the drought. Crop receipts were up \$5.9 billion in 1988.

As a result, the drought had little or no impact on the earnings of the sector as a whole, even though many producers in the drought States suffered significant losses of income. The higher prices benefitted producers in other States more than enough to offset those unfortunate enough to be situated in the drought States.

Cattle prices continued to rise, contributing to a \$3.4-billion jump in livestock receipts, but again this was mostly offset by the rise in livestock related expenses. Feed purchases rose \$2.9 billion, reflecting the higher grain prices, and expenditures for livestock purchases rose another \$900 million, reflecting the higher prices and improving fundamentals in cattle production.

High market prices led to decreased deficiency payments, so Government payments were down \$2.3 billion, initiating a trend away from the previous year's record high. The net result was that the sector experienced a small gain in net farm income from the prior year's record. The increase in net cash income was double that of net farm income because none of the sales was offset by the effects of the inventory selloff.

1989: Reaping the Benefits of High Crop and Cattle Prices

In 1989, cattle prices showed another hefty gain (table B-2), and the drought-reduced supplies of crops ensured that the high crop prices of 1988 carried forward into the new year. Crop production staged a full recovery from the low yields of the prior year. Farmers had both crop and livestock production to sell and did so at favorable prices. Farmers had the best of both worlds in 1989, in contrast to the typical case where production is high and prices are low or vice versa.

The consequence was that crop receipts were up \$5.1 billion and livestock were up \$4.7 billion for a total increase of \$9.8 billion. In addition, farmers added another \$4.3 billion of production to inventories in order to rebuild the stocks depleted in the prior year. The additions to inventory, which are reflected in net farm income, represented an enhancement to farmers' wealth in the form of assets held for future sale or to use as feed and seed in lieu of future purchases.

Another drop in Government payments partially offset the rising components of gross farm income, but that was to be expected. Improving market fundamentals for farm production lessened the need for Government assistance as the sector continued its move to self reliance. Other farm-related income

showed an unexplainable, one-time jump in custom feeding fees, but since these fees are also an expense to other participants in the sector (see other miscellaneous expenses in table B-1), there was no net effect on the "bottom line" as represented by either of these two net earnings indicators.

Expenses rose \$6.3 billion as farmers responded to the new-found prosperity by expanding the inputs committed to production. Increased expenditures occurred in almost every category carried in the farm income accounts. Not surprisingly, feed purchases led the way with a \$600-million rise, reflecting the combined effects of improving fundamentals for cattle producers and the high grain prices. Expenditures were up for fertilizer, pesticides, labor, repair and maintenance, seed, and livestock purchases; and with favorable prices for agricultural commodities, farmers sought to step up production in order to have more to sell.

In a reversal of the prior year's relationship, net farm income rose \$9.5 billion, in contrast to \$2 billion for net cash income. Arithmetically, almost all of the difference was accounted for by the \$7.8 billion swing in the value of the inventory adjustment from a negative \$3.5 billion to a positive \$4.3 billion. In reality, this inventory factor was a reflection of the huge jump in the value of agricultural production in 1989 over 1988.

1990: Continuing Prosperity

In 1990, market prices for cattle and hogs rose (table B-2) to levels that were extremely high by historical standards. Crop production continued at near record levels for the second consecutive year, and more was available for sale because there was less need to replace inventories depleted in 1988. Despite 2 consecutive years of favorable weather and high yields, corn prices held relatively stable due to corn's critical role as the principal feed in a prospering livestock sector.

In the 1990 increase of receipts, livestock led the way with \$5.5 billion, while crops rose \$3.6 billion. Government payments declined \$1.6 billion, the third year of decline. Other farm-re-

lated income dropped \$1.5 billion as the prior year's jump in custom feeding fees ended. The effect of this change was offset in the "other miscellaneous expenses" account.

Expenses were remarkable only in the lack of significant changes, except those directly related to the prospering livestock sector where expenditures for feed, not-yet-for-market livestock, and labor surged upward.

Net farm income registered a modest gain of about \$758 million in 1990 to remain on the rarefied plateau of \$50 billion. Net cash income scaled to new heights with a \$2.4-billion move to \$61.8, surpassing \$60 billion for the first time.

By 1990, the Government's most recent major initiative to divert land from agricultural production was also having considerable success, and by extension, supportive effects on farm income. From the initial 750,000 acres enrolled in the Conservation Reserve Program (CRP) in 1986, its year of inception, enrollment had reached a cumulative 34.5 million acres in 1990. To participate in the CRP, farmers must remove land from production for at least a decade, and on a more permanent basis if they choose the option of planting the land to trees.

Land enrolled in the CRP subtracts from the acreage base potentially available for crops, hay, and pasture, which in turn should have the effect of lowering the aggregate production of agricultural commodities. Less production translates directly into smaller supplies available to meet demand, thereby contributing to market conditions conducive to higher prices. The smaller current supplies and improvement in prices, in turn, provide less incentive to add to inventories in hopes of selling in the future at more favorable prices. Low carryover stocks trace through to lower future supplies and positive price effects (tables B-3 and B-4).

Farm Incomes Are Back to Normal

A look at net farm income in real (1982) terms, gives a clear indication that U.S. farmers are doing about as well as they

Table B-4--Marketing year average prices for major U.S. crops, 1987-91

Year	Corn	Sorghum	Wheat	Rice	Soybeans	Cotton 1/
	\$/bu.	\$/bu.	\$/bu.	\$/cwt.	\$/bu	Cents/lb.
1986/87	1.50	1.57	2.42	3.75	4.78	52.40
1987/88	1.94	1.70	2.57	7.27	5.88	64.30
1988/89	2.54	2.27	3.72	6.83	7.42	56.60
1989/90	2.36	2.90	3.72	7.35	5.69	66.20
1990/91	2.30	2.10	2.61	6.50	5.75	67.80

Source: Agricultural Outlook, September 1991, USDA, Econ. Res. Ser.
1/ Upland and extra long staple.

Table B-5--Summary of the U.S. farm sector's financial status, selected years

Year	Net farm income	Net cash income	Assets 1/	Debt 1/	Equity 1/
			Billion 1982 dollars		
1957	38.1	41.0	658.1	66.0	592.1
1958	44.3	46.5	697.0	71.4	625.6
1959	35.2	41.2	693.4	78.0	615.5
1960	36.3	41.4	679.6	80.3	599.4
1967	34.4	41.9	799.7	128.1	671.6
1968	32.7	42.2	796.8	127.1	669.8
1969	35.9	45.6	782.7	126.9	655.8
1970	34.2	43.7	772.1	125.7	646.4
1977	29.5	41.4	1092.4	176.7	915.8
1978	34.9	45.9	1194.0	189.2	1004.8
1979	34.9	42.5	1274.3	206.7	1067.6
1980 2/	18.8	39.9	1270.9	208.5	1062.4
1987	33.8	47.1	776.3	130.9	645.4
1988	33.5	47.3	788.8	122.4	666.4
1989	39.6	47.0	772.8	115.6	657.2
1990	38.7	47.0	757.6	110.3	647.2

Source: Economic Indicators of the Farm Sector, National Financial Summary, 1990, USDA, ERS.

1/ Includes operator dwellings. 2/ A major drought occurred in 1980 causing a significant decline in crop production and thus net farm income. Farmers maintained cash income by selling large quantities from inventory at favorable prices.

have normally done for the past several decades. Their earnings, while good, are certainly not out of line with historical incomes and may be near an equilibrium level, to which the sector's income keeps returning.

Both net farm income and net cash income have been remarkably stable when comparing the period 1987-90 to the corresponding years in the previous three decades whether measured in real or deflated dollars (table B-5). This is particularly true of net farm income, which reflects the net value of produc-

tion within a particular year, i.e., the sector's contribution to the national economy. Real net cash income may have shifted upward slightly, but that appears to be in response to more emphasis on cash flow management and maximization in response to the financial crisis and heavier debt burdens in the 1980's.

The deflated earning series in table B-5 underscore the fact that the farm sector's crisis was really a balance sheet crisis and not an earnings crisis. In the late 1970's, the real value of the sector's equity surged above its long-term normal level when land values were bid to heights that, in the early 1980's, proved to be unsustainable. Debt followed land value upward to levels that were out of line with what could be supported by the sector's real income and a correction followed. Land values fell until the historical equilibrium relationship between equity and net farm income was re-established.

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² Net farm income is a measure of the net value of production occurring in a given year. Thus the receipts from sales of commodities produced in prior years are eliminated via the offsetting inventory adjustment. Net cash income reflects all cash transactions occurring within the calendar year, regardless of the year when production occurred. Thus, the increase in net cash income was more than double that of net farm income, as farmers sold off their crop inventories.

Farm Equity by State, Ranked Three Ways

Duane Hacklander and Kenneth Erickson¹

Abstract: Farm equity is ranked by State for 1990 using three different measures. The results vary dramatically, with New Jersey having the highest farm equity per acre, Texas the most total farm equity, and Arizona the highest equity per farm.

Keywords: Equity, rank, States, per farm, per acre

At the end of 1990, New Jersey had the highest farm equity (excluding operator households) per acre in the United States (table C-1). Using this measure of equity, the top five ranked States were all in the Northeast.

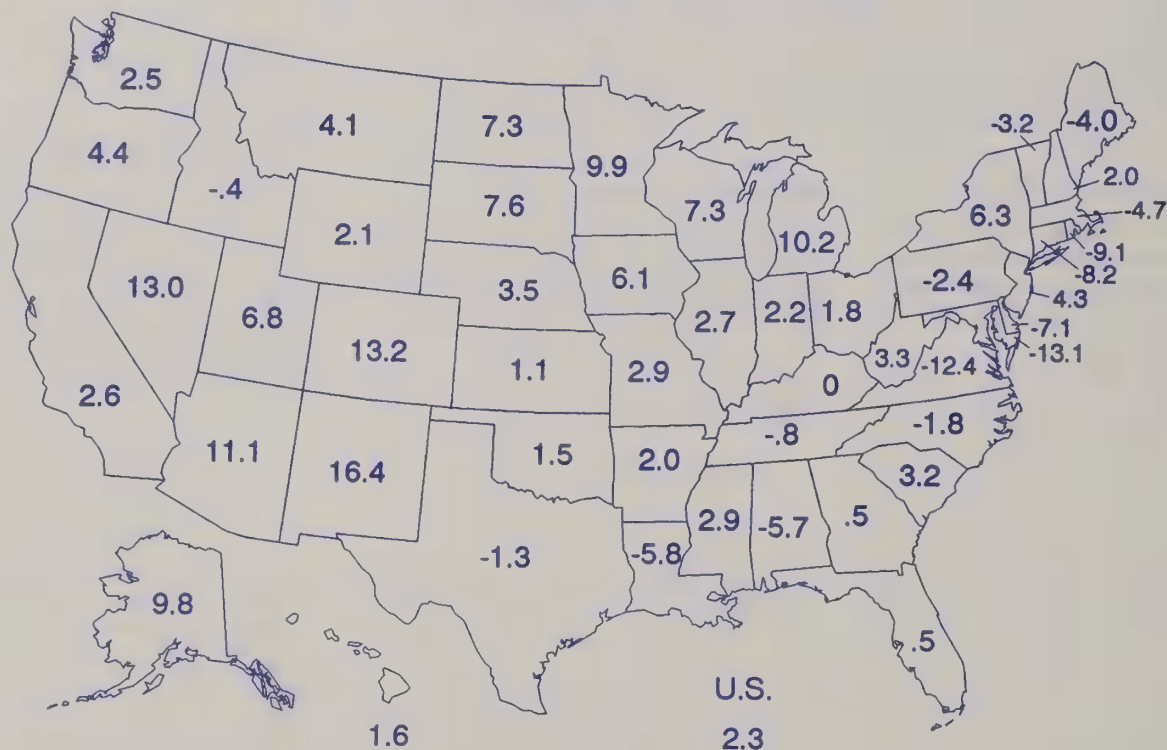
Equity equals assets minus debt. Farm equity is strongly influenced by real es-

tate values, because real estate normally accounts for over 70 percent of farm assets. In addition, debt generally averages less than one-fifth of average assets. For example, the four States with the highest per-acre real estate assets were identical to the four States with the highest per acre farm equity. With few exceptions, the State rankings were

within three places of each other for all 50 States.

The measure of total farm equity per State is a more traditional way of presenting State rankings of farm equity. Here the leaders, as expected, are Texas and California. By this measure, the top five States (10 percent) held one-third

Figure C-1--Percent Change In Farm Equity During 1990
(Excludes Operator Households)



- U. S. farm equity increased over 2 percent from December 31, 1989 to December 31, 1990.
- Farm equity declined in 16 States, showed no change in one, and increased in the other 33 States.
- The largest declines were in States along the Atlantic Coast, from Virginia to Maine, and in Alabama and Louisiana.
- Large increases occurred in the Lake States and Northern Plains and in New Mexico, Arizona, Colorado, Utah,

Table C-1--Farm equity (excluding operator households) ranked by State, 1990

Rank	Total	State	Per farm	State	Per acre	State	State	Total	Rank	Per farm	Rank	Per acre	Rank
	Mil. \$		Thous. \$		\$			Mil. \$		Thous. \$		\$	
1	65,277	TX	1,192	AZ	8,484	NJ	AL	8,138	33	173	47	806	28
2	58,216	CA	1,082	NV	7,310	CT	AK	514	49	886	4	514	38
3	41,268	IL	911	NJ	5,670	RI	AZ	9,298	30	1,192	1	258	47
4	41,192	IA	886	AK	5,046	MA	AR	11,513	25	245	36	743	31
5	28,392	NE	787	CT	2,149	NH	CA	58,216	2	685	7	1,890	9
6	27,951	MN	766	NM	2,018	FL	CO	13,737	19	518	13	415	42
7	23,391	KS	685	CA	1,982	MD	CT	3,070	41	787	5	7,310	2
8	22,080	MO	635	WY	1,964	DE	DE	1,121	47	386	21	1,964	8
9	21,992	FL	622	MT	1,890	CA	FL	21,992	9	536	11	2,018	6
10	20,335	IN	612	HI	1,868	PA	GA	12,017	21	250	33	961	25
11	20,004	OH	536	FL	1,647	HI	HI	2,816	42	612	10	1,647	11
12	18,208	WI	536	RI	1,448	IL	ID	9,170	31	421	19	669	34
13	17,226	SD	518	CO	1,277	VA	IL	41,268	3	497	16	1,448	12
14	16,639	ND	498	NE	1,274	OH	IN	20,335	10	299	28	1,248	15
15	16,369	OK	497	MA	1,248	IN	IA	41,192	4	396	20	1,230	16
16	15,365	MT	497	IL	1,230	IA	KS	23,391	7	339	25	488	41
17	15,131	PA	492	SD	1,202	VT	KY	14,234	18	153	48	1,009	24
18	14,234	KY	489	ND	1,190	NC	LA	6,863	35	214	42	771	29
19	13,737	CO	421	ID	1,141	NY	ME	1,583	46	192	45	954	26
20	12,534	TN	396	IA	1,107	MI	MD	4,459	39	293	29	1,982	7
21	12,017	GA	386	DE	1,035	WI	MA	3,431	40	497	15	5,046	4
22	11,993	WA	363	NH	1,019	SC	MI	11,953	23	221	41	1,107	20
23	11,953	MI	353	UT	1,011	TN	MN	27,951	6	314	27	932	27
24	11,541	NC	351	TX	1,009	KY	MS	8,911	32	223	40	685	33
25	11,513	AR	339	KS	961	GA	MO	22,080	8	204	44	726	32
26	11,367	VA	324	WA	954	ME	MT	15,365	16	622	9	254	48
27	10,337	NM	314	MN	932	MN	NE	28,392	5	498	14	603	36
28	9,585	NY	299	IN	806	AL	NV	2,704	43	1,082	2	304	46
29	9,518	OR	293	MD	771	LA	NH	1,053	48	363	22	2,149	5
30	9,298	AZ	285	PA	750	WA	NJ	7,381	34	911	3	8,484	1
31	9,170	ID	261	OR	743	AR	NM	10,337	27	766	6	232	49
32	9,111	MS	259	VT	726	MO	NY	9,585	28	249	34	1,141	19
33	8,484	AL	250	GA	685	MS	NC	11,541	24	186	46	1,190	18
34	7,381	NJ	249	NY	669	ID	ND	16,639	14	489	18	411	44
35	6,863	LA	247	VA	611	WV	OH	20,004	11	238	37	1,274	14
36	6,654	WY	245	AR	603	NE	OK	16,369	15	237	38	1,502	39
37	5,301	SC	238	OH	535	OR	PA	9,518	29	261	31	535	37
38	4,656	UT	237	OK	514	AK	RI	15,131	17	285	30	1,868	10
39	4,459	MD	228	WI	502	OK	TX	5,397	50	536	12	5,670	3
40	3,431	MA	223	MS	495			5,301	37	212	43	1,019	22
41	3,070	CT	221	MI	488	KS	SD	17,226	13	492	17	389	45
42	2,816	HI	214	LA	415	CO	TN	12,534	20	141	49	1,011	23
43	2,704	NV	212	SC	412	UT	TX	65,277	1	351	24	495	40
44	2,260	WV	204	MO	411	ND	UT	4,656	38	353	23	412	43
45	1,815	VT	192	ME	389	SD	VT	1,815	45	259	32	1,202	17
46	1,383	ME	186	NC	304	NV	VA	11,367	26	247	35	1,277	13
47	1,120	DE	173	AL	258	AZ	WA	11,993	22	324	26	750	30
48	1,053	NH	153	KY	254	MT	WV	2,260	44	110	50	611	35
49	514	AK	141	TN	232	NM	WI	18,208	12	228	39	1,035	21
50	397	RI	110	WV	162	WY	WY	5,654	36	635	8	1,162	50
	698,187	US	326	US	707	US	US	698,187		326		707	

of total farm equity on December 31, 1990. The five States holding the least amount of total farm equity accounted for less than 1 percent.

Another measure of farm equity is equity per farm. Arizona and Nevada lead the way with equity per farm of over \$1 million. The relationship between per-farm equity and per-acre equity is a function of average size of farms. For example, farms in Arizona and Nevada tend to be much larger than the U.S. average. This is dramatically shown by

the fact that although these two States ranked highest in equity per farm, they ranked 46th and 47th in farm equity per acre. The eight States with the lowest per-acre farm equity all had farms that averaged over 1,000 acres in 1990, well above the U.S. average of 461 acres. These large farms typically have more lower-valued range and pastureland.

The three measures presented are alternative ways of ranking States by farm equity. The results are strikingly different among the measures. For example,

Texas ranked first in total farm equity, 24th in per-farm equity and 40th in farm per-acre equity. California is the only State that ranked in the top ten for all three measures. The measure that is most appropriate depends upon the question. Which States have the most (least) farm equity? How much equity is involved in a farm operation in various States? How much does farm equity per acre vary among States?

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Farmer Mac: Can It Help Indebted Farm Operators?

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Abstract: Farmer Mac was designed to increase the supply of reasonably priced farm credit by creating a secondary mortgage market for farm real estate loans. Analysis of USDA's 1989 Farm Costs and Returns Survey (FCRS) suggests that Farmer Mac can do little to increase the credit available to currently indebted farm operators. Even though farm financial conditions have improved since Farmer Mac was legislated in 1987, only 18 percent of debt owed by farm operators at the end of 1989 would qualify under Farmer Mac standards. Qualifying operators are financially sound. Generally, they have no difficulty in obtaining necessary financing under any market conditions. Farmer Mac's future viability is limited to the extent that it depends on conversion of current debt.

Keywords: Farmer Mac, loan standards, credit, income, debt.

Farmer Mac was authorized by the Farm Credit Act of 1987, creating a secondary mortgage market for farm real estate loans. A shortage of reasonably priced farm credit in the first half of the decade was perceived to have contributed to the farm financial crisis of the mid-1980's. At the time of its creation, Congress envisioned Farmer Mac operating much like the successful secondary markets for residential mortgages. Farm real estate loans would be originated by participating lenders, and groups of these loans would be pooled for sale to investors. Originators would use the proceeds from the sale of loans to make new loans, keeping interest rates competitive, and expanding the supply of available credit for farm operators.

Farmer Mac has not yet become an active participant in the farm mortgage market for a variety of reasons (Koenig and Ryan). Its future potential will ultimately be determined by originations of eligible new loans, and by rewriting existing debt to a format consistent with Farmer Mac packaging. While Farmer Mac was not designed to address the needs of farm operators who were financially stressed at the time of its enactment, its potential will be strongly affected by its usefulness in meeting the needs of currently indebted operators.

The purpose of this paper is to determine the volume of outstanding farm operator real estate and nonreal estate debt that could potentially be rewritten, restructured, or otherwise modified to qualify for Farmer Mac. Data for this analysis are provided by USDA's 1989 Farm Costs and Returns Survey (FCRS).

Current Farm Debt

Total farm real estate debt, including debt on farm operator dwellings, was approximately \$80 billion at the end of 1989 (USDA). Of this, nearly \$9 billion was owed to the Farmers Home Administration and \$17 billion was owed to individuals (predominately sellers) and others. Approximately \$54 billion of existing farm real estate debt is held by Farmer Mac qualifying institutional lenders (Farm Credit System, life insur-

ance companies, and commercial banks), and, theoretically, could be immediately available for pooling for the secondary market.

Nonreal estate debt accounted for another \$65 billion in farm sector debt at the end of 1989 (USDA). Farmer Mac guidelines do not preclude the refinancing of nonreal estate debt under a qualifying real estate mortgage, as long as these additional amounts could be sup-

Farm Costs and Returns Survey, 1989

The FCRS is a probability-based personal enumeration survey conducted by USDA to collect production and financial data from a representative sample of farm operators. General income and expense data are collected for all farms, while separate versions of the questionnaire collect detailed income and expense data, farm operator household data, or cost of production data for specific crop and livestock enterprises. While no national survey of producers provides complete data for all financial variables of interest to economists, the FCRS now provides comprehensive coverage for most financial activities. Nonoperator farmers, landlords, and contractors are not included in the survey.

The 1989 FCRS resulted in 11,794 farm operators reporting various financial data. Since the FCRS is a probability survey, each respondent

represents a number of other farms of similar size and type. These sampled operators represent an expanded 1,729,454 farm operator base. (USDA reports a total of 2,171,000 farms in 1989. The bulk of the under-represented farms are in the smaller size classes, which would probably be ineligible for Farmer Mac farm loans).

FCRS respondents report farm debt for farm business use. Generally, debt secured by farm assets, but used for nonfarm purposes, is not reported. In 1989, these operators reported an estimated \$42.6 billion in farm business real estate debt (53 percent of total farm sector real estate debt) and \$40.3 billion in farm business nonreal estate debt (61 percent of total farm sector nonreal estate debt). In total, the 1989 FCRS covers 57 percent of all farm sector debt. This is the proportion of outstanding farm debt that is reported by operators as having been incurred for farm business purposes.

ported by the value of the real estate offered as security for the loan.

Farmer Mac has developed a precise set of credit underwriting and loan repayment standards for mortgages that will be acceptable for pooling (FAMC). Even though the full \$80 billion real estate debt, and the additional \$67 billion nonreal estate debt could conceivably be restructured to meet Farmer Mac eligibility requirements, much of this volume will not meet Farmer Mac qualifying standards.

The balance of this paper presents research designed to determine the volume of existing farm operator debt that could potentially qualify for Farmer Mac. Following a discussion of each of the Farmer Mac standards, results of the analysis of FCRS data are discussed. The number of borrowers qualifying under each individual Farmer Mac standard is presented, along with the total operator debt owed each lender that would qualify under that standard. Then, estimated Farmer Mac eligible real estate and total farm debt (that meeting all Farmer Mac standards simultaneously) will be presented.

Farmer Mac Qualifying Standards

The Farmer Mac guidelines require that all loans included in a pool meet creditworthiness criteria and seven underwriting standards. (Recent revisions allow Farmer Mac to waive some criteria and standards for certain seasoned loans. This analysis does not incorporate these revisions). Originators are responsible for determining and fully documenting that each loan meets these criteria and standards. Farmer Mac's lending philosophy is embodied in the Farmer Mac Securities Guide (FAMC).

"Farmer Mac expects that the use of the Underwriting Standards would result in the extension of loans that will not require intensive servicing...The Originator is responsible not only for determining that each Qualified Loan meets the Underwriting Standards, but also for assuring that the documents in each loan file conclusively support that determination...All loans in a Pool shall be made to creditworthy, financially responsible Borrowers of proven integrity and sound financial background and

condition. Loans shall be adequately secured so that the occurrence of adverse operating or economic conditions will still permit recovery of principal and interest." (FAMC, Section 4.1, p. 401).

Standard 1—Creditworthiness of the Borrower

In addition to confirming the character, capital, capacity, condition, and collateral involved in each loan, loan originators must obtain complete and current credit reports for each borrower. The credit report must include a current Uniform Commercial Code lien search, historical experience, reporting of all debts, and all pertinent information. While the FCRS attempts to obtain full disclosure of all debts, the voluntary nature of the survey precludes addressing critical creditworthiness variables. Data related to slow payment history, undisclosed debts, judgments, garnishments and liens, and bankruptcies are not collected, as these items are not within the realm of the survey's purpose.

Standard 2—Income Statements and Balance Sheets

The loan applicant must provide income statements and fair market value balance sheets for the last 3 years. The current statements should be adjusted to reflect the value of production by recognizing noncash expenses and changes in inventory, accounts payable, accounts receivable, and prepaid expenditures. Standard forms for computing these measures are included in the Securities Guide and must be submitted with each loan.

The FCRS is designed to collect data for the construction of income statements, balance sheets, and statements of cash flow. Three-year financial statements for individual operations are not obtainable, since the sample for the survey is drawn anew each year. Historical analysis is limited to annual comparisons among regions and farm sizes and types. In this study, 1 year financial statements are derived using the 1989 FCRS.

In the FCRS, income data are reported on a cash accounting basis, with addi-

tional information provided on depreciation, value of non-cash benefits provided to hired labor, value of home consumption of farm production, and values of beginning and ending inventories of machinery, crops, livestock, and purchased feed and other inputs. Since the FCRS is not a longitudinal survey, changes in accounts receivable, changes in interest payable, and gains and losses from the sale of capital assets are not directly obtained. As a result, information to precisely estimate accrual net income is not available. However, in obtaining critical data for converting from cash to an accrual basis, depreciation and inventory changes, the FCRS allows for a close approximation of accrual net income. (A representative FCRS income statement is presented in table D-1).

The FCRS does not collect data for a number of current asset and liability accounts. While properly constructed farm balance sheets are not directly obtainable, yearend balances for these accounts can generally be estimated from annual expense data reported in the survey. For this analysis, estimates were incorporated into the data reported in FCRS for purposes of December 31, 1989, balance sheet construction. (A representative FCRS balance sheet is presented in table D-2).

FCRS respondents report short-term farm financial assets, and crop, livestock and purchased input inventories. Estimated current assets included these items plus prepaid insurance (estimated at 25 percent of 1989 insurance expense).

Current liabilities include reported short-term loans outstanding plus the following accruals and payables:

- accrued interest—3 percent of ending loan balances, based on Farm Credit System yearend ratio of accrued interest to gross loans outstanding;
- property taxes payable—100 percent of 1989 real property taxes plus 25 percent of 1989 personal property taxes;

Table D-1--Farm operation income statement, farms of qualifying size reporting farm debt, by sales class,
December 31, 1989

	Value of sales				All farms
	\$250,000 or more	\$100,000- \$249,999	\$40,000- \$99,999	Less than \$40,000	
Number of farms	84,321	152,421	156,806	480,865	874,413
Percent of farms	9.64	17.43	17.93	54.99	100.00
Dollars per operation					
Gross cash income	573,693	152,106	66,407	11,813	100,241
Livestock sales	267,482	68,101	31,873	5,122	46,197
Crop sales	253,086	62,300	21,980	3,487	41,124
Government payments	22,938	12,850	6,000	1,131	6,150
Farm-related income	30,187	8,855	6,554	2,073	6,770
Less: Cash expenses	439,922	118,076	55,030	16,653	82,031
Variable	366,558	88,024	40,639	10,775	63,904
Livestock purchases	77,199	9,485	4,647	1,485	10,748
Feed	73,474	15,862	7,574	1,658	12,120
Veterinary expenses	6,122	2,141	1,135	252	1,306
Other livestock expenses	3,454	598	551	96	589
Seed and plants	14,877	5,765	2,357	516	3,146
Fertilizer and chemicals	46,743	16,711	6,235	1,324	9,267
Labor	62,802	9,026	3,191	736	8,606
Fuels and oils	15,024	6,547	3,336	962	3,717
Repairs and maintenance	25,254	10,261	5,241	1,754	6,129
Machine-hire/custom work	7,391	2,136	1,281	354	1,509
Utilities	12,679	3,560	2,146	645	2,583
Other variable expenses	21,539	5,932	2,942	993	4,185
Fixed	73,364	30,052	14,392	5,878	18,126
Real estate/property taxes	6,546	2,943	1,805	1,019	2,028
Interest	35,112	14,171	7,490	3,428	9,084
Insurance premiums	8,690	3,941	1,967	714	2,270
Rent and lease payments	23,016	8,996	3,130	717	4,743
Equals: Net cash farm income	133,771	34,029	11,376	-4,840	18,210
Less:					
Depreciation	37,895	16,004	8,901	2,394	9,357
Labor, non-cash benefits	2,307	462	255	37	369
Plus:					
Value of inventory change	17,423	13,786	6,686	2,658	6,744
Nonmoney income	503	400	292	217	290
Equals: Net farm income	111,495	31,749	9,198	-4,396	15,518
Memoranda:					
Modifications for debt service coverage					
Net farm income	111,495	31,749	9,198	-4,396	15,518
+ Depreciation	37,895	16,004	8,901	2,394	9,357
+ Real estate interest	21,262	8,987	5,223	2,874	6,134
+ Nonreal estate interest	7,095	3,379	1,316	334	1,760
+ Capital lease payments	2,051	522	152	35	335
+ Net off-farm income	20,354	13,439	17,094	35,784	27,049
- Family living expenses	21,169	18,731	13,953	12,686	14,785
- Income tax	31,883	10,546	6,335	6,542	9,646
= Income for debt coverage	147,799	44,802	21,597	17,797	35,722
Greater of:					
Reported interest payments	29,057	12,366	6,540	3,207	7,894
Estimated interest payments	27,453	12,363	7,402	4,078	8,372
+ Capital principal payments	41,637	17,225	10,551	5,412	11,886
+ Capital lease payments	2,051	522	152	35	335
= Debt to be covered	77,952	32,771	19,451	10,110	22,277
Ratio					
Debt coverage ratio	1.90	1.37	1.11	1.76	1.60

Source: Farm Costs and Returns Survey, 1989

percent of the sum of net farm income and off-farm income. Because farm operators typically make quarterly estimated tax payments, the payable portion of the 1989 income taxes is estimated to be 35 percent of total tax due on net farm income. No payable is assumed on off-farm income. If estimated net farm income is negative, the income tax payable is zero.

- accrued rent/lease payments—25 percent of 1989 total rent and lease payments for 1) tractors, vehicles, equipment, or storage structures, and 2) cash rented land;
- the current portion of intermediate and long term debt—24.55 percent of yearend intermediate debt plus 6.7 percent of yearend long term debt. The current portion of outstanding debt was derived from one version of the FCRS, which obtained data on

scheduled and unscheduled principal payments.

Standard 3—Debt-to-Asset Ratio

The entity being financed should have a pro forma debt-to-asset ratio of 50 percent or less, after closing any new loan. Using FCRS data, the ratio is estimated to include only currently existing farm business assets and liabilities. This ratio was calculated directly from the FCRS balance sheet data described above.

Table D-2--Farm operation balance sheet, farms of qualifying size reporting farm debt, by sales class,
December 31, 1989

	Value of sales				All farms
	\$250,000 or more	\$100,000- \$249,999	\$40,000- \$99,999	Less than \$40,000	
Number of farms (expanded)	84,321	152,421	156,806	480,865	874,413
Number of farms (sample)	2,058	1,851	1,259	2,086	7,254
Percent of farms	9.64	17.43	17.93	54.99	100.00
	Dollars per operation				
Current assets					
Livestock inventory	75,767	22,563	13,107	4,180	15,888
Crop inventory	89,360	33,957	13,338	2,311	18,199
Purchased inputs	13,361	3,344	1,183	248	2,220
Prepaid insurance	2,172	985	492	178	568
Other assets	60,390	23,275	14,744	15,828	21,229
Total current assets	243,223	85,110	43,356	22,924	58,671
Intermediate assets					
Breeding animals	83,872	37,367	27,453	7,958	23,901
Farm equipment	198,742	99,154	57,132	20,817	58,142
Investment in coops	9,127	2,932	1,122	482	1,858
Total intermediate assets	291,741	139,454	85,707	29,256	83,900
Fixed assets					
Operators dwelling	51,664	37,963	37,646	46,938	44,163
Land and buildings	859,336	323,267	238,088	114,376	244,810
Total fixed assets	911,000	361,230	275,735	161,314	288,973
Total assets	1,455,091	588,725	405,919	213,976	433,402
Current liabilities					
Accrued interest	10,340	4,467	2,615	1,376	3,002
Property tax payable	5,641	2,670	1,648	916	1,809
Income tax payable	10,002	2,915	1,263	176	1,796
Rent and leases payable	5,754	2,249	783	179	1,186
Total accruals and payables	31,737	12,301	6,309	2,648	7,792
Current portion of debt					
Loans less than 1 year	52,611	16,217	8,519	2,446	10,773
Intermediate debt	32,297	12,303	7,715	3,663	8,657
Long term debt	9,340	4,222	2,835	1,750	3,229
Total current liabilities	125,984	45,743	25,378	10,507	30,451
Non-current liabilities:					
Non-real estate	99,259	37,810	23,712	11,257	26,605
Real estate	130,059	68,540	39,481	24,363	44,967
Total non-current liabilities	229,317	106,350	63,193	35,621	71,573
Total liabilities	355,301	152,093	88,572	46,127	102,024
Net worth	1,099,790	436,632	317,348	167,849	331,378
Memoranda:					
Average farm debt by lender:					
Federal land banks	73,216	26,349	11,390	6,155	17,081
Production Credit Associations	31,422	9,607	3,449	1,176	5,970
Commercial banks	133,594	47,422	33,545	22,425	39,497
Life insurance companies	11,342	3,727	1,629	749	2,268
Farmers Home Administration	26,376	25,564	18,398	5,812	13,495
Individuals and others	34,538	20,722	11,072	5,866	12,154
All others	13,078	6,401	3,780	1,296	3,767
CCC Crop loans	11,414	3,895	1,481	44	2,070
	Ratio				
Current ratio	1.93	1.86	1.71	2.18	1.93
Debt/asset ratio	0.24	0.26	0.22	0.22	0.24
Real estate d/a ratio	0.15	0.20	0.15	0.16	0.17
All debt/RE assets ratio	0.39	0.42	0.32	0.29	0.35

Source: Farm Costs and Returns Survey, 1989

Standard 4—Debt Service and Liquidity Ratios

The entity being financed should be able to generate sufficient earnings and liquidity to meet all obligations as they come due and, in addition, provide a reasonable margin for capital replacement and contingencies. This standard is achieved by having minimum liquidity ratios for qualifying loans.

- a) The total debt service coverage ratio should be no less than 1.25:1,

including income from farm and nonfarm sources. This standard requires commingling of farm and household incomes. It is not clear which household members' incomes should be included.

- b) The current ratio should be no less than 1:1.

The Securities Guide (FAMC) further defines the calculations for these ratios:

- a) Total debt coverage ratio:

Net farm income
+ Depreciation
+ Interest on capital debt
+ Capital lease payments
+ Net off-farm income
- Living expenses

- Income taxes

= Numerator

Principal and interest on capital debt

+ Capital lease payments

= Denominator

The additions and subtractions to net farm income are intended to standardize the calculation of the numerator for use in this ratio.

The determination of net farm income using FCRS was described in Standard 2. Farm operators directly report depreciation and net off-farm income. Other components of the above ratio must be estimated from FCRS data:

- interest on capital debt—total 1989 real estate interest paid plus that portion of the nonreal estate interest attributable to intermediate term debt;
- capital lease payments—75 percent of reported payments for rent or lease of tractors, vehicles, equipment or storage structures;
- living expenses—these were reported in one version of the 1989 FCRS. The results obtained there for various farm operation sales classes were applied to all farms. The living expense estimates used in this study were 1) if farm sales greater \$250,000—living expense = \$21,262, 2) sales of \$100,000 to \$250,000—\$18,831, 3) sales of \$40,000 to \$100,000—\$13,967, and 4) sales less than \$40,000—\$12,686.
- income tax expense—20 percent of the sum of 1989 net farm income plus off-farm income. If the sum was negative, then income tax expense was zero.
- principal and interest on capital debt—principal repayments were considered to be the current portion of the intermediate and long term debt, as reported in the balance sheet description. To allow for loans taken during the year, interest on capital

debt was calculated to be the greater of 1989 interest on capital debt or estimated 1990 interest payments. Capital interest payments in 1990 were estimated to be farm sector average interest rates times yearend debt reported. (10.95 percent times total intermediate term debt, 9.36 percent times total long term debt).

b) Current ratio = current assets / current liabilities

This ratio was calculated directly from the FCRS balance sheet data described above.

Standard 5—Loan-to-Appraised Value (LTV) and Cash Flow Debt Service Coverage Ratios.

The LTV in financing any individual property should not exceed 75 percent. A minimum 1:1 debt service cash flow ratio from the subject property is also required, except for loans in which the borrower's principal residence is on the property securing the loan. The cash flow debt service coverage ratio is to be computed using the net property income determined by the appraiser.

Using FCRS data, the reported value of all land and buildings was considered to be the appraised value, while the relevant loan amount was calculated under two assumptions: 1) the loan amount was limited to currently reported long term debt (real estate debt-to-real estate asset ratio); and 2) the loan amount was limited to currently reported total debt (total debt-to-real estate asset ratio). The cash flow debt service coverage ratio was computed in similar fashion to the total debt service coverage ratio of Standard 4. However, net off-farm income, living expenses, and income taxes were excluded from the numerator, while the denominator was unchanged.

This standard does not apply to operators indicating that their principal residence is located on the farm operation.

Standard 6—Minimum Acreage and Annual Receipts Requirements.

Farmer Mac also established initial minimum acreage or minimum annual

receipt requirements for qualifying farm properties. Agricultural real estate must consist of at least 5 acres of land, or be used to produce annual receipts of \$5,000 in order to be eligible to secure a qualified loan.

FCRS operators reporting fewer than 5 acres owned at year-end, or gross cash farm income of less than \$5,000 were excluded from the analysis.

Standard 7—Loan Conditions.

The loan must be level-payment or level-principal payment, and either:

- a) fully amortize principal over a term not to exceed 30 years; or
- b) amortize principal according to a schedule not to exceed 30 years, and mature no earlier than the time at which the remaining principal balance of the loan equals 50 percent of the original appraised value of the property securing the loan.

FCRS respondents do not indicate whether their existing loans have balloon payments. Recently, commercial banks have reported an increasing incidence of loans written for periodic renewal at the interest rate current at the time of renewal. Typically, loan payments follow a 30-year amortization schedule, with a balloon payment for the principal being due in 5 years. This restriction would seem to disqualify these commercial bank loans. A loan made at a maximum Farmer Mac LTV of 75 percent would be reduced to a 50-percent LTV loan when one-third of the principal had been repaid. For loans written at interest rates in the 8- to 12-percent range, this amount of principal would not normally be retired until years 18-22 of the amortization schedule.

Standards Summary—Farmer Mac Qualifying Worksheet

Loan originators are required to include with each qualified loan package submitted to a pooler a standardized loan application, completed and signed by the borrower. Standardized income statements, balance sheets, and ratio computation forms are to be included with the package. The underwriting

Table D-3--Farmer Mac Qualifying Worksheet, farms of minimum size reporting farm debt, by sales class,
December 31, 1989

	Value of sales				All farms
	\$250,000 or more	\$100,000- \$249,999	\$40,000- \$99,999	Less than \$40,000	
Number of farms (expanded)	84,321	152,421	156,806	480,865	874,413
Number of farms (sample)	2,058	1,851	1,259	2,086	7,254
Dollars per operation					
A. Pro forma current ratio					
Current assets	243,223	85,110	43,356	22,924	58,671
Current liabilities	125,984	45,743	25,378	10,507	30,451
Current ratio	1.93	1.86	1.71	2.18	1.93
B. Pro forma debt-to-asset ratio					
Total liabilities	355,301	152,093	88,572	46,127	102,024
Total assets	1,455,091	588,725	405,919	213,976	433,402
Debt/asset ratio	0.24	0.26	0.22	0.22	0.24
C. Pro forma total debt service coverage					
Net farm income	111,495	31,749	9,198	-4,396	15,518
+ Depreciation	37,895	16,004	8,901	2,394	9,357
+ Interest on capital debt	29,057	12,366	6,540	3,207	7,894
+ Capital lease payments	2,051	522	152	35	335
+ Net off-farm income	20,354	13,439	17,094	35,784	27,049
- Family living expenses	21,169	18,731	13,953	12,686	16,785
- Income tax	31,883	10,546	6,335	6,542	9,646
= Numerator	147,799	44,802	21,597	17,797	35,722
P & I on capital debt	75,900	32,249	19,299	10,075	21,942
+ Annual capital lease payments	2,051	522	152	35	335
= Denominator	77,952	32,771	19,451	10,110	22,277
Debt coverage ratio	1.90	1.37	1.11	1.76	1.60
D. Loan-to-value (LTV) ratio					
Qualified loan amount (RE debt)					
Real estate debt	139,398	73,462	42,316	26,113	48,196
Real estate d/a ratio	0.15	0.20	0.15	0.16	0.17
Qualified loan amount (All debt)					
All debt	355,301	152,093	88,572	46,127	102,024
All debt/RE assets ratio	0.39	0.42	0.32	0.29	0.35
E. Cash flow debt service coverage ratio					
Net farm income	111,495	31,749	9,198	-4,396	15,518
+ Depreciation	37,895	16,004	8,901	2,394	9,357
+ Interest on capital debt	29,057	12,366	6,540	3,207	7,894
+ Capital lease payments	2,051	522	152	35	335
= Numerator	180,498	60,641	24,791	1,241	33,104
P & I on capital debt	75,900	32,249	19,299	10,075	21,942
+ Annual capital lease payments	2,051	522	152	35	335
= Denominator	77,952	32,771	19,451	10,110	22,277
Cash flow debt coverage ratio	2.32	1.85	1.27	0.12	1.49
Memoranda:					
Total farm debt by lender:					
Federal land banks	6,174	4,016	1,786	2,960	14,936
Production Credit Associations	2,650	1,464	541	566	5,220
Commercial banks	11,265	7,228	5,260	10,783	34,536
Life insurance companies	956	568	99	360	1,983
Farmers Home Administration	2,224	3,896	2,885	2,795	11,800
Individuals and others	2,912	3,158	1,736	2,821	10,628
All others	1,103	976	593	623	3,294
Total farm debt	27,283	21,307	12,899	20,908	82,397
Real estate debt	11,754	11,197	6,635	12,557	42,144
Nonreal estate debt	15,529	10,110	6,264	8,351	40,254

Source: Farm Costs and Returns Survey, 1989

standards relevant for each loan application are summarized in the Farmer Mac Qualifying Worksheet (FAMC, p. U-1). A qualifying worksheet for farm operators has been prepared for use with FCRS data. (An FCRS Farmer Mac Qualifying Worksheet is presented in table D-3. Data are for farms meeting Farmer Mac minimum size requirements that also reported outstanding debt at yearend 1989).

Farmer Mac Eligibility of Current Farm Operators

This analysis is designed to estimate the amount of existing farm business debt that could be restructured to meet Farmer Mac standards. While estimating the total debt carrying capacity of currently debt-free FCRS farm operators could contribute to an understanding of the potential for Farmer Mac, it is beyond the scope of this paper.

The FCRS can not address issues raised under *Standard 1* (creditworthiness—

credit report) or *Standard 7* (loan terms and conditions); doing so would likely further reduce our estimates of existing operator debt that would qualify for Farmer Mac. To apply the other Farmer Mac eligibility criteria to FCRS farm operators, income statements (table D-1), balance sheets (table D-2), and Farmer Mac qualifying worksheets (table D-3) were prepared for all farm operators. Initially, two eliminations were made from the FCRS dataset: 1) all farm operations that did not meet *Standard 6* (minimum size—5 acres or \$5,000 gross cash farm income), and 2)

Table D-4--All farms, farms with debt, and lender debt held by farms meeting Farmer Mac underwriting standards, 1989

Item	All farms	Farms of qualifying size with debt 1/	Farms meeting individual Farmer Mac standards					Farms qualifying for Farmer Mac 7/
			Debt/asset ratio 2/	Total debt coverage 3/	Current ratio 4/	Real estate d/a ratio 5/	CF debt service 6/	
Number								
Number of farms	1,729,454	874,413	725,484	450,501	473,282	823,585	775,347	235,628
Total farm debt by lender:	Million dollars							
Federal land banks	14,944	14,936	10,503	6,414	6,791	13,172	13,444	3,283
Prod'n Credit Assns	5,221	5,220	3,964	2,262	2,740	4,704	4,583	916
Commercial banks	35,045	34,536	22,832	14,815	14,694	30,987	29,540	5,786
Life insurance cos	1,988	1,983	1,431	690	936	1,826	1,578	382
Farmers Home Admin	11,819	11,800	5,101	3,174	4,442	8,073	10,701	1,220
Individuals	10,659	10,628	7,631	4,684	5,590	9,505	9,601	2,450
All others	3,529	3,294	2,230	1,392	1,463	2,988	2,720	628
Total farm debt	83,004	82,397	53,692	33,431	36,656	71,255	72,167	14,664
Real estate	42,647	42,144	26,066	18,891	19,950	33,066	38,494	8,575
Nonreal estate	40,357	40,254	27,627	14,541	16,704	38,188	33,673	6,090
Percent								
Percent of all farms	100.00	50.56	41.95	26.05	27.37	47.64	44.83	13.62
Percent of farms with debt		100.00	82.97	51.52	54.13	94.22	88.67	26.95
Total farm debt by lender:								
Federal land banks	100.00	100.00	70.32	42.94	45.47	88.19	90.01	21.98
Prod'n Credit Assns	100.00	100.00	75.94	43.33	52.49	90.11	87.80	17.55
Commercial banks	100.00	100.00	66.11	42.90	42.55	89.72	85.53	16.75
Life insurance cos	100.00	100.00	72.16	34.80	47.20	92.08	79.58	19.26
Farmers Home Admin	100.00	100.00	43.23	26.90	37.64	68.42	90.69	10.34
Individuals	100.00	100.00	71.80	44.07	52.60	89.43	90.34	23.05
All others	100.00	100.00	67.70	42.26	44.41	90.71	82.57	19.06
Total farm debt	100.00	100.00	65.16	40.57	44.49	86.48	87.58	17.80
Real estate debt	100.00	100.00	61.85	44.82	47.34	78.46	91.34	20.35
Nonreal estate debt	100.00	100.00	68.63	36.12	41.50	94.87	83.65	15.13

Source: Farm Costs and Returns Survey, 1989

1/ Farms with at least 5 acres or \$5,000 in gross cash farm income. 2/ Borrowers pro forma total debt-to-asset ratio cannot exceed 50 percent. 3/ Ratio must be no less than 1.25:1, including net income from farm and nonfarm sources. 4/ Ratio of current assets to current liabilities must be no less than 1:1. 5/ Ratio of the debt on property financed to its appraised value must not exceed 75 percent. 6/ If borrower's principal residence is not on property securing the loan, the cash income to cash expenses and debt service ratio must be no less than 1:1. 7/ All Farmer Mac standards must be met simultaneously to qualify.

all farms that did not report any loans outstanding at yearend. Loans outstanding include only reported debt, and not the accruals and payables estimated as described above.

Comparable sets of financial statements were prepared for farm operators meeting these size and debt criteria. To this subset of FCRS respondents, each of the remaining Farmer Mac underwriting standards was individually applied, and a complete set of financial statements was generated for those operators qualifying under that standard. This determined the amount of existing farm debt, the amount owed to individual lenders, and the number of currently indebted farm operators that could potentially be restructured to be eligible for Farmer Mac under each standard. The sample for the remainder of the study was limited to farmers meeting size and debt restrictions so that the average ratios computed in the analysis would not be distorted by including debt-free farm operators in the computations.

From the set of financial statements, summaries showing the number of operators, the total amount of farm debt held by each of the various farm lenders, and the total amounts of debt reported on real estate and nonreal estate are presented for farm operators meeting each underwriting standard (table D-4) and for those meeting all underwriting standards. Only those operators meeting all standards would qualify for Farmer Mac loans. The minimum size criteria eliminated less than 5 percent of FCRS respondent farms. However, over 47 percent of all FCRS respondents meeting this qualifying size criteria (and almost 50 percent of all respondents) reported no loans outstanding at yearend 1989.

Results from application of individual Farmer Mac standards indicate that, despite the declining land values and debt restructuring that took place during the financial stress of the 1980's, farm asset values (at least as estimated by the operator) are not a limiting factor in credit extension decisions. Over 65 percent of

all farm debt could be restructured under Farmer Mac under the debt-to-asset ratio standard (maximum of 50 percent), and over 86 percent of the current real estate debt could be refinanced under the real estate debt-to-asset ratio standard (maximum of 75 percent).

Life insurance company borrowers were best able to meet the Farmer Mac debt-to-asset criteria, with over 72 percent of all debt qualifying for restructuring under this standard. Farm Credit System borrowers fared nearly as well, with slightly less than 72 percent of FCS debt qualifying. Only 66 percent of commercial banks' debt met this criteria. Similar results held for the real estate debt-to-asset ratio, with approximately 90 percent of the debt held by these institutional lenders qualifying.

The most restrictive criteria relate to loan repayment capacity. Less than 44 percent of debt would qualify under the current ratio standard (minimum 1:1), while less than 41 percent of operator

debt meets the total debt service coverage ratio minimum of 1.25:1. Furthermore, the cash flow debt service coverage ratio minimum of 1:1 could be met by only 44 percent of all farm operators. However, since this standard does not apply if the operator's principal residence is located on the operation. Almost 88 percent of all debt meets this criteria. Exempting owner-occupied farm units from this standard effectively eliminated it as a restriction for Farmer Mac loan qualification purposes.

Generally, Farmers Home Administration (FmHA) direct loans are not qualified for this secondary market. However, all FmHA direct loans could be refinanced by a qualifying lender in order to gain Farmer Mac eligibility. (FmHA guaranteed loans are eligible under Farmer Mac II). Operators currently indebted on FmHA direct loans would have the smallest portion of loans that could be made eligible for Farmer Mac under most criteria. Commercial bank debt qualification was most restricted by the current ratio standard. The total debt coverage ratio was the most restrictive for all other lenders.

Farmer Mac eligibility requires that all standards be met. Less than 18 percent of all debt reported in the 1989 FCRS is owed by operators that meet all qualifying standards. That is, of the \$82.4 billion of outstanding farm debt for farm business purposes reported in the 1989 FCRS, only \$14.7 billion would meet all Farmer Mac qualifying standards.

If Farmer Mac qualifying standards are viewed as credit scoring criteria, sellers financing real estate transactions would appear to have the highest loan portfolio quality of all lenders, as over 23 percent of all seller-held debt would qualify for Farmer Mac. However, because few of these loans have been written with the mandated level of documentation, they would not easily be made marketable under Farmer Mac.

Among institutional lenders, the Farm Credit System had the highest percentage of farm business debt qualifying for Farmer Mac, with almost 21 percent of FCS debt eligible for Farmer Mac. Less than 17 percent of commercial bank debt owed by farm operations would meet all qualifying standards.

Among individual standards, the total debt service coverage ratio criteria appears to be the most difficult to meet. This ratio was calculated with estimated values for living expenses and income taxes. To evaluate the restrictiveness of this measure as calculated, the number of borrowers (and amount of debt they owed) meeting all standards except the total debt service coverage ratio was also estimated. Excluding this standard increased the proportion of debt qualifying to \$24.4 billion (almost 30 percent).

Conclusion

This analysis suggests that Farmer Mac will not serve to greatly expand the credit alternatives of currently indebted farm operators. Even though farm financial conditions have improved in recent years, 70 to 80 percent of debt owed by farm operators at the end of 1989 apparently would not qualify under Farmer Mac standards. This does not necessarily suggest that these standards should be relaxed to permit easier borrower qualification—that might only decrease investor interest in Farmer Mac.

Farm operators qualifying under the current standards are financially sound, which can be expected because this is a condition the standards require. Generally, these operators have not experienced a problem in obtaining necessary financing under any market conditions. For the last several years, the agricultural loan market has been very competitive. Lenders have generally reported surplus loanable funds, but a shortage of qualified borrowers. As a result, there is little incentive for Farmer Mac qualifying operators, or for their lenders, to convert their existing debt instruments into the form necessary for acceptance in the secondary market.

Taken together, these findings indicate that, if it is currently legislated, many indebted farm operators may experience only limited access to the benefits that a smoothly functioning Farmer Mac might produce. Most highly indebted farm operators, those that could benefit most from lower interest rates, will not qualify for the Farmer Mac market. If the secondary market's future viability depends on conversion of

current debt, Farmer Mac will continue to be an insignificant factor in agricultural credit markets.

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Concentrations of Hired and Contract Labor Expenses

Victor Oliveira¹

Abstract: In 1987, farmers spent almost \$13 billion on hired and contract labor, which accounted for about 12 percent of total U.S. farm production expenses. Contract labor accounted for 15 percent of total farm labor expenses. Data from the 1987 Census of Agriculture show that the largest users of paid labor on a per-farm basis were large farms, and vegetable, fruit and tree nut, and horticultural specialty farms. California and Florida accounted for almost one-third of all farm labor expenses. The effects of changes in current farm labor policies and programs would most likely be concentrated in these labor-intensive States.

Keywords: Hired labor, contract labor, farm labor expenses, farm production expenses

Paid labor is a substantial input in U.S. agriculture. Over 950,000 farms, or about 46 percent of all U.S. farms, used paid labor in 1987, according to data from the 1987 Census of Agriculture.^{2/} These farms produced about 84 percent of the total value of sales of farm products. Farmers spent almost \$13 billion for labor in 1987, which accounted for 12 percent of total farm production expenses. The average labor expense on farms with paid labor was \$13,318.

While most farmers hired their workers directly, some employed labor contractors or crew leaders to provide the farmworkers. Farm labor contractors act as intermediaries, matching farmworkers with farm jobs, and are involved in recruiting, hiring, transporting, or supervising the workers. A recent trend in farm labor has been the increased use of contract labor, which accounted for almost 15 percent of all labor expenses in 1987, up from 10 percent in 1974 (Census of Agriculture, U.S. Summary and State Data and Geographic Area Series).

The incidence of farms using paid labor has increased as the trend toward fewer but larger farms increased the paid labor requirements per farm. The percentage

of farms employing hired labor increased from 36 percent in 1974 to 39 percent in 1987, while the percentage of farms employing contract labor more than doubled, from 5 percent to 13 percent (Census of Agriculture). Labor's share of total farm production expenses increased from 8 percent to 12 percent over the same period.

As the relative importance of hired and contract labor in the farm production process has increased, so has the attention placed on farm labor issues. In both 1990 and 1991, the Select Committee on Aging of the U.S. House of Representatives held hearings on a broad range of concerns relating to the living and working conditions of the Nation's hired farmworkers. One of the themes echoed by the General Accounting Office and various farmworker groups testifying before the Committee was the lack of workplace safeguards for many farmworkers (Association of Farmworker Programs, GAO).

Because many Federal and State protection programs have special exemptions for agriculture, many farmworkers are currently exempt from the basic workplace protections available to other U.S. workers (Runyan). For example, mini-

mum wage guarantees under the Fair Labor Standards Act extend only to those farmworkers who work on the larger farms, those that used 500 or more man-days of labor during a calendar quarter of the preceding year. Other Federal programs, such as the Occupational Safety and Health Act, the Migrant and Seasonal Worker Protection Act, and the Federal Unemployment Tax Act, also have exemptions for agricultural employers based on number of employees and days worked.

Although no further legislative action has been announced, issues related to current legislative exclusions and the socioeconomic problems of hired farmworkers are likely to receive continued congressional and media interest. Future changes in laws affecting the wages and working conditions of hired farmworkers could have important implications for many farm employers and their workers. The magnitude of the impact cannot be directly assessed without more specific details of legislative changes. However, examination of farm labor expenses by farm type, size, and geographic area will help to identify the major users of farm labor that are most likely to be affected by changes in farm labor legislation. Data presented

in this article are the latest available and come from unpublished special tabulations on labor from the 1987 Census of Agriculture.

Labor Expenses by Type of Farm

The amount of labor used on farms is directly related to the commodity being produced and the degree to which farm production has been mechanized. Several measures, including total labor expenses, percentage of farms with labor expenses, average farm labor expenses on farms employing labor, and the share of total farm production expenses attributed to labor, indicate the relative importance of labor by type of farm (table E-1 and figures E-1 and E-2).

Vegetable, Fruit and Tree Nut, and Horticultural Specialty Farms—These are the most intensive users of labor. These farms are among the least mechanized of all farms. Many crops are still hand harvested and require many seasonal workers. In 1987, these farms comprised only 7 percent of all U.S. farms, but accounted for 40 percent of all U.S. farm labor expenses. Farm labor expenses accounted for 37-44 percent of total farm production expenses on these farms. Horticultural specialty farms had the highest average labor expenses per farm—\$88,715, followed by vegetable farms at \$74,709, and fruit and tree nut farms at \$34,585.

Field Crop Farms—Seventy-seven percent of all cotton farms used some paid labor during the year, more than any other type of farm. In terms of labor expenditures per farm, cotton farms (\$24,435) also used above-average amounts of labor. However, in general, these farms are not very labor intensive. The high proportion of farms using paid labor and relatively large per-farm labor expense is due mostly to the greater size of these operations and their need for more labor than can be provided solely by the farm family. Labor accounted for 17 percent of total production expenses on cotton farms.

Cash grain farms are among the most mechanized and least labor intensive of all farm types. Only 43 percent of all cash grain farms employed paid labor, and the average labor expense was \$6,046, among the lowest of all farm types. Labor accounted for only 6 percent of all farm production expenses.

Tobacco farms had average labor expenses of only \$3,763, the lowest of all commodity types. Much of the U.S. tobacco crop is hand harvested and therefore labor intensive. However, because of the small size of most tobacco operations, operators and their families are able to supply much of the labor. Paid labor is generally needed only for short periods, such as harvest.

Only 42 percent of other crop farms (farms that derived at least half of their total value of sales from crops, but less

than half from any single crop group) used paid labor. Those that did had average labor expenses of \$15,762, which accounted for 17 percent of all farm production expenses.

Livestock Farms Beef, hog, and sheep farms were the second largest users of paid farm labor, with total labor expenses of \$2.1 billion in 1987. Yet, these farms are among the least labor intensive of all farms. The large labor expense on beef, hog, and sheep farms was due to the great number of farms. They comprised 43 percent of all farms, while accounting for only 17 percent of total U.S. farm labor expenses. Labor accounted for only 5 percent of total production expenses on these farms, lowest of all farm types.

A high proportion of poultry and egg farms (63 percent) used paid labor. In terms of average labor expenditures per farm, poultry and egg farms (\$34,119) also used above-average amounts of labor. These farms are generally not very labor intensive, however, as labor accounted for only 7 percent of total production expenses.

Two-thirds of all dairy farms had labor expenses, the average being \$14,284. Labor accounted for 10 percent of all farm production expenses on these farms. Despite increased mechanization, the labor requirements in dairying remain high and inflexible. However, operators and their families provide much of the labor used on dairy farms.

Table E-1--Farm labor expenses by type of farm, 1987

Characteristic	Farms			Labor expenses		
	All	With labor expenses		Hired	Contract	Total
	Number	Number	Percent	\$1,000	\$1,000	\$1,000
All farms	2,087,750	954,278	46	10,866,236	1,842,984	12,709,220
Type of farm:						
Cash grain	461,116	197,496	43	1,084,179	109,813	1,193,992
Cotton	27,466	21,065	77	440,824	73,905	514,729
Tobacco	88,204	51,831	59	171,386	23,670	195,056
Vegetable	29,793	16,532	55	929,159	305,924	1,235,083
Fruit and tree nut	89,070	60,774	68	1,512,511	589,351	2,101,862
Horticultural specialty	30,461	19,782	65	1,614,813	140,156	1,754,969
Other crop	183,956	76,713	42	1,026,076	183,092	1,209,168
Beef, hogs, and sheep	898,715	359,188	40	1,877,815	216,952	2,094,767
Dairy	136,528	91,018	67	1,234,542	65,551	1,300,093
Poultry and egg	36,479	23,064	63	680,118	106,792	786,910
Other livestock	105,962	36,815	35	294,813	27,779	322,592
Sales class:						
Less than \$100,000	1,798,689	711,125	40	1,312,154	379,106	1,691,260
\$100,000-\$249,999	198,288	156,407	79	1,842,149	274,364	2,116,513
\$250,000-\$499,999	58,750	54,869	93	1,768,654	235,551	2,004,205
\$500,000 and over	32,023	31,877	99	5,943,280	953,963	6,897,243

Figure E-1--Labor's Share of Total Production Expenses Was Over 35 Percent on Vegetable, Fruit & Tree Nut, and Horticultural Specialty Farms in 1987

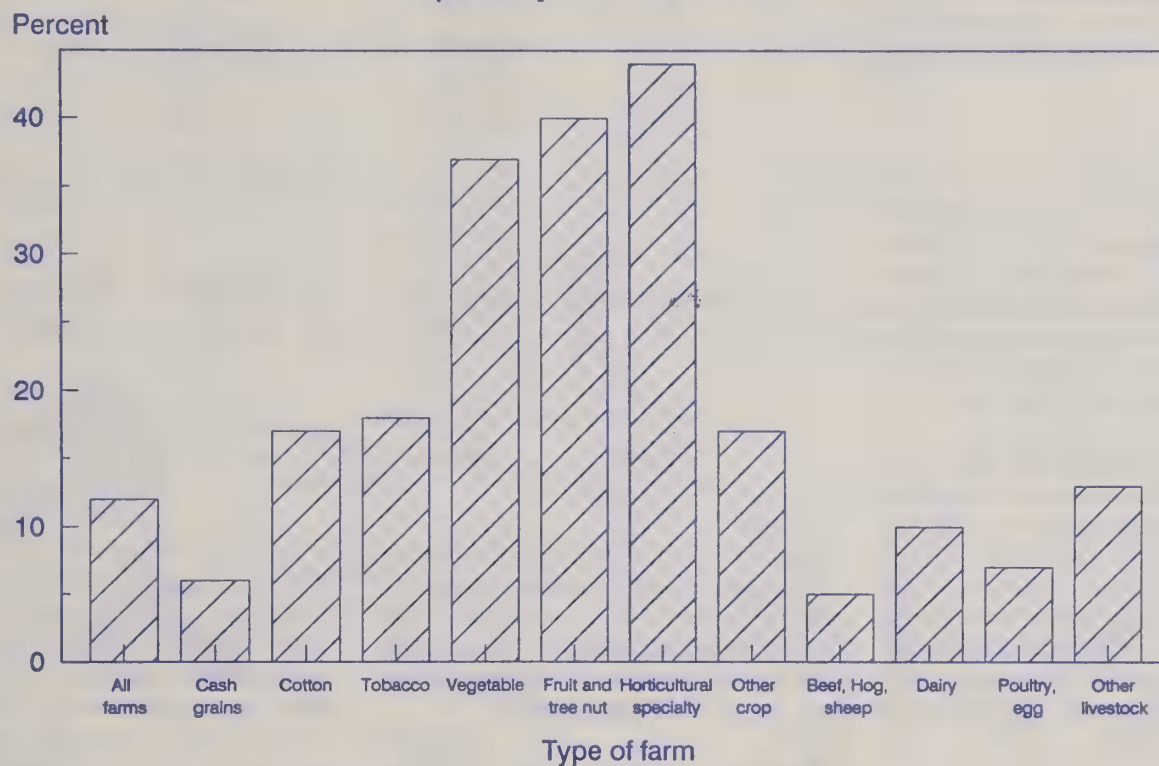
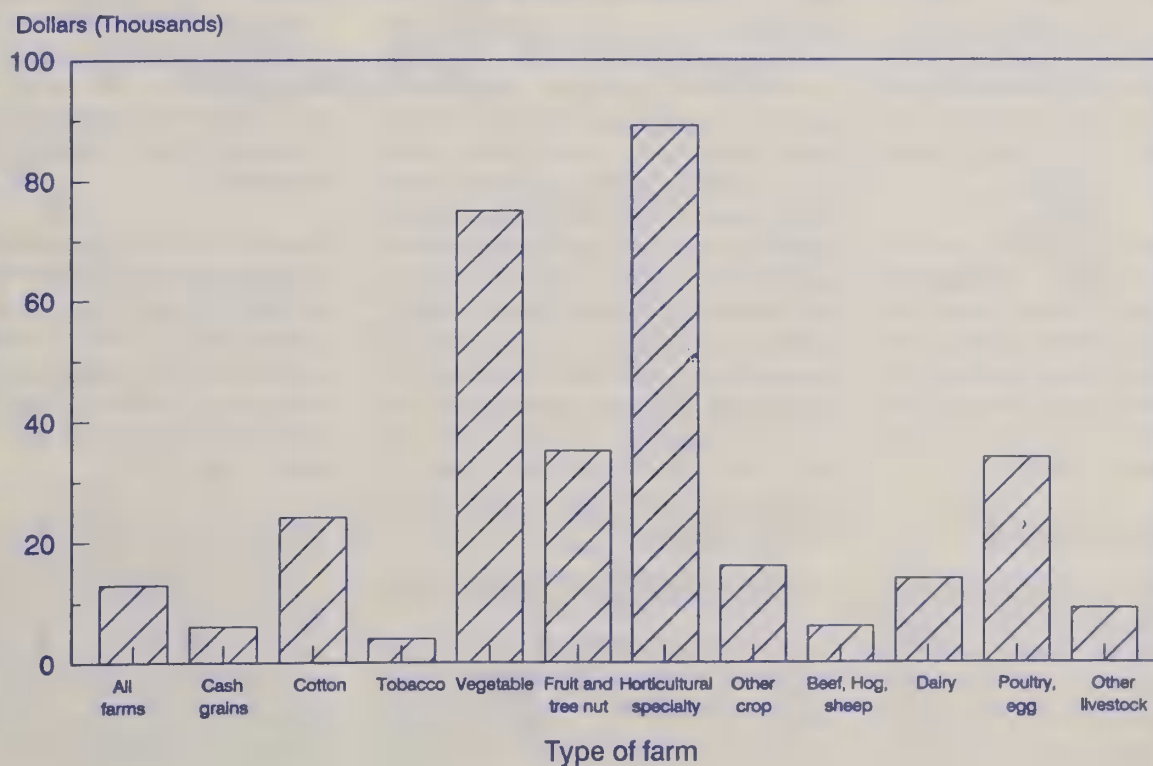


Figure E-2--Average Per Farm Labor Expenses Were Highest on Horticultural Specialty and Vegetable Farms in 1987



In general, other livestock farms (consisting of farms deriving half of their total value of sales from livestock, but less than half from any single commodity group) were not labor intensive. Only 35 percent of these farms had labor expenses, the lowest of all types of farms. The average farm labor expense was \$8,763.

Size of Farm

The amount of labor used on farms is related to the type and size of the farm. Larger farms are more likely to have labor needs greater than what can be provided by farm operators and their families. The value of sales on the farm is used as a measure of farm size.

Although the largest farms, those with sales of \$500,000 or more, made up less than 2 percent of all farms, they accounted for 54 percent (almost \$7 billion) of all U.S. farm labor expenses (table E-1). Conversely, farms with sales of less than \$100,000 made up 86 percent of all farms, but accounted for only 13 percent of all U.S. farm labor expenses.

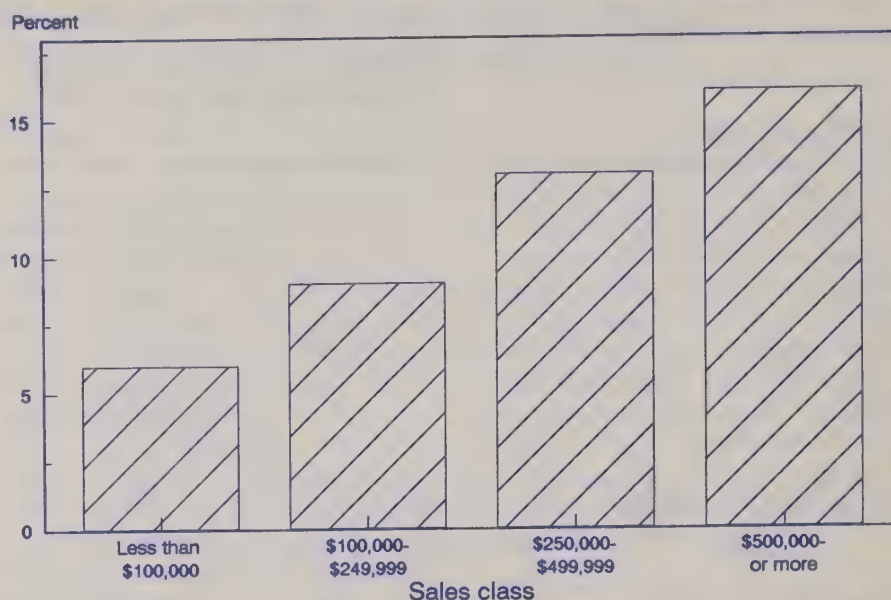
The percentage of farms using paid labor increased as size of farm increased. Only 40 percent of the farms with annual sales of less than \$100,000 had labor expenses, compared with 79 percent of the farms in the \$100,000-\$249,999 sales class, 93 percent of the farms in the \$250,000-\$499,999 sales class, and almost 100 percent of the farms with sales of \$500,000 or more (table E-1).

Labor accounted for a greater percentage of total production expenses on larger farms than on smaller ones. The proportion of total expenses attributed to labor increased from 6 percent for farms with sales of less than \$100,000 to 16 percent for farms with sales of \$500,000 or more (figure E-3).

Contract Labor Expenses

Fruit and tree nut farms and vegetable farms were the largest users of contract labor, accounting for almost half of all contract labor expenses in 1987. Contract labor accounted for one-quarter of total labor expenses on these farms. Fruit and vegetable growers need ade-

Figure E-3--Labor's Share of Total Farm Production Expenses Increased As Size of Farm Increased in 1987



quate labor to be available at precise times, especially at harvest, because of the perishability of these crops. Farm labor contractors can provide a steady amount of labor for these growers during peak labor demand periods.

Contract labor expenses, like total labor expenses, were concentrated on the largest farms. About 52 percent of all contract labor expenses were on farms with sales of \$500,000 or more. However, contract labor expenses as a percentage of total labor expenses were greatest on the smaller farms. About 22 percent of the total labor expenses on farms with sales of less than \$100,000 were attributed to contract labor, compared with 12-14 percent for the larger size classes. Contracting labor instead of hiring workers directly may be more convenient and efficient for small farmers who need relatively small amounts of labor. Some small farmers may use contractors to avoid becoming employers subject to taxes, regulations, and employer liability. Use of a contractor may also reduce a farmer's need for capital investment in farmworker housing and equipment.

Farm Labor by Geographic Area

Labor expenses were highly concentrated by geographic area. Eight States—California, Florida, Texas, Washington, Wisconsin, North Carolina, Pennsylvania, and Iowa—ac-

counted for over half of all labor expenses in 1987 (table E-2). Farms in California were the largest users of hired and contract labor, with expenses of almost \$3 billion, or 24 percent of all labor expenses in the United States. Florida was the second largest employer, with farm labor expenses over \$1 billion, or 8 percent of the total, followed by Texas with labor expenses of \$773 million, or 6 percent of the total. In California and Florida, fruit and tree nut, vegetable, and horticultural specialty farms were the chief types accounting for the high labor expenses. In Texas, however, the large number of less labor-intensive beef, hog, and sheep farms accounted for most of the labor expenses.

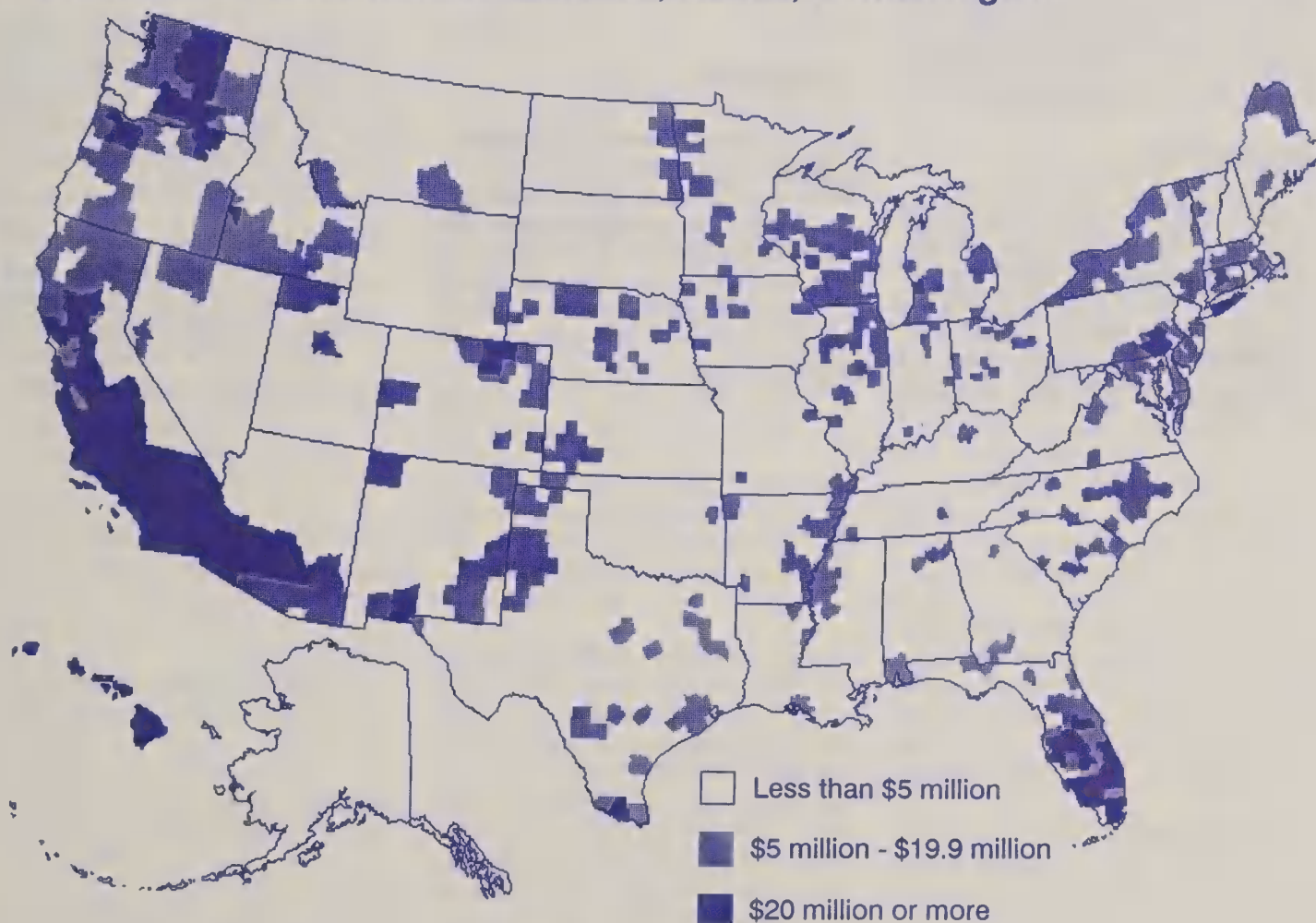
The distribution of farm labor expenses at the county level further illustrates the geographic patterns of labor use. Counties were classified into three categories based on expenditures for labor: less than \$5 million, \$5 million to less than \$20 million, and \$20 million or more (figure E-4).

Labor use on farms was widespread. Four hundred and seventy-five counties across the country had labor expenses of \$5 million or more. Only five States—Alaska, Rhode Island, South Dakota, New Hampshire, and West Virginia—did not have a county with labor expenses of \$5 million or more.

Table E-2--In 1987, the eight leading States accounted for over half of total labor expenses and nearly two-thirds of contract labor expenses

State	Total labor expenses		Contract labor expenses	
	\$1,000	Percent	\$1,000	Percent
California	2,998,582	23.6	613,340	33.3
Florida	1,002,021	7.9	280,481	15.2
Texas	773,391	6.1	143,120	7.8
Washington	468,976	3.7	48,208	2.6
Wisconsin	329,162	2.6	16,837	0.9
North Carolina	329,126	2.6	42,089	2.3
Pennsylvania	320,959	2.5	28,929	1.6
Iowa	303,547	2.4	21,032	1.1
Total	6,525,764	51.3	1,194,036	64.8
All other States	6,183,456	48.7	648,948	35.2
United States	12,709,220	100.0	1,842,984	100.0

Figure E-4--Two Thirds of the Counties with Labor Expenses of \$20 Million or More Were in California, Florida, or Washington



The distribution of counties with farm labor expenses of \$20 million or more was more highly concentrated. Seventy-one counties in 15 States had farm labor expenses of \$20 million or more. Most of these high-labor-expense counties were located in the West. Twenty-nine of these counties were located in California, 7 in Washington, 4 each in Hawaii and Oregon, and 3 in Arizona.

Florida (13 counties) and Pennsylvania (3 counties) were the only nonwestern counties to have more than 1 county with labor expenses of \$20 million or more. Idaho, Colorado, New Mexico, Texas, Kentucky, New York, Connecticut, and Michigan each had one county with labor expenses of \$20 million or more.

Thirteen of these 71 high labor expense counties exceeded \$100 million (table E-3). Fresno County, California led the Nation with hired and contract labor expenses of \$358 million in 1987, which was greater than labor expenses in each of 46 States. Only two of these counties, Palm Beach, Florida and Yakima County, Washington, were outside California. Fruit and tree nut, veg-

Table E-3--In 1987, 13 counties had labor expenses over \$100 million

County, State	Total labor expenses \$ millions
Fresno, California	358.1
Kern, California	265.4
Monterey, California	242.5
Palm Beach, Florida	226.7
Tulare, California	204.0
Ventura, California	176.2
San Joaquin, California	126.6
Riverside, California	124.2
San Diego, California	118.9
Stanislaus, California	116.1
Yakima, Washington	112.0
Merced, California	110.0
Imperial, California	106.3
All other counties	10,422.2
United States	12,709.2

etable, and horticultural specialty farms accounted for the majority of labor expenses in the counties with over \$100 million in farm labor expenses.

Implications

Large farms, and those specializing in vegetables, fruit and tree nuts, and horticultural crops are the most labor intensive of all farms and are the most likely to be affected by changes in farm labor legislation. California and Florida led in terms of farm labor use. However,

even in most low labor-using States there were counties that used large amounts of labor and would feel the impact of changes in farm labor legislation.

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² The Census of Agriculture is conducted by the U.S. Department of Commerce, Bureau of the Census. Estimates from the Census of Agriculture may differ from estimates derived by ERS in its sample surveys. Reasons for the noncomparability include differences in coverage, sampling techniques, and collecting and estimating methods. See the Census of Agriculture for an explanation of the data collection process and statistical methodology associated with the Census of Agriculture.

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Regional Responsiveness of Agricultural Interest Rates to U.S. Treasury Bill Rates

Ronald A. Babula, Douglas Duncan, and Utpal Vasavada

Abstract: Changes in the national Treasury bill rate are shown to have regional differences in the effect on agricultural lending rates. Cattle loan rates, operating loan rates, and long term mortgage rates in the Kansas City Federal Reserve District are shown to have the most immediate and smoothest responses to a Treasury bill rate decline

Keywords: Agricultural interest rates, vector autoregression, regional interest rate dynamics.

How does a change in the rate paid by the U.S. Government on its 3-month Treasury bills (T-bill rate) pulsate through agricultural credit markets? This question concerns policymakers when agricultural interest rate response patterns differ among regions—say across different Federal Reserve Districts (FRDs). Several interrelated components of this question will be analyzed.

(i) What have been the average reaction times for agricultural loan rates to respond to a fall in the T-bill rate?

(ii) What is the direction and dynamic quarterly pattern of an FRD's agricultural interest rate response to a decline in the T-bill rate?

(iii) What is the average historical duration of an FRD's response in agricultural interest rates due to a T-bill rate decline?

(iv) How strong is the agricultural interest rate response to T-bill movements for an FRD?

(v) Are regional differences noticeable in the dynamic response patterns of the above?

Items (i) through (v) are referred to as the “dynamic” aspects of an FRD's agricultural interest rate response to a change (in this study, a decline) in the T-bill rate. As a preliminary step, data sources for quarterly FRD agricultural loan rates were identified (see box on data). Data were obtained from the first quarter of 1976 through the first quarter of 1991 for three rates and four FRDs. These rates were for feeder cattle loans (FCL), other farm operating loans (OOL), and long term real estate mort-

gages (LTM). Only Chicago, Dallas, Kansas City, and Richmond FRD data were available for the time period considered.

Theory and observed historical experience suggest that interest rates for different regions move in tandem in the long run. A change in the T-bill rate, therefore, may be expected to pulsate through agricultural credit markets in the four districts. Accordingly, a testable hypothesis is that agricultural interest rate responses to a T-bill rate change are immediate and similarly patterned across FRD's. The modeling strategy adopted below does not constrain these responses to conform to this pattern. Rather than imposing *a priori* restrictions such as equal regional responses, data-oriented and non-theoretical methods were used. These methods permit any dynamic regularities in the data to reveal themselves.

An important historical perspective on agricultural interest rates underlies the time period considered here. In the late 1970's agriculture was considered to be a low risk lending opportunity and aggregate farm loans outstanding increased with a low risk premium in the interest rate. Subsequently, farm debt grew until 1983 when it peaked and the farm financial crisis came into view. Agricultural loan delinquencies and chargeoffs increased dramatically at commercial banks, peaking in 1985 and resulting in a post-depression high of 75 agricultural bank failures in 1987.

Concurrent with the loan repayment problems was a major increase in the risk premium of agricultural interest rates. As a rough approximation of the shift in risk premiums, the commercial bank agricultural loan rate stood at 131

percent of the 90 day T-bill rate in 1981 and rose to 193 percent in 1986 before falling to 153 percent of it in 1990. Thus, the interregional differences evaluated in this article were occurring against a backdrop of sectoral interest rate changes as well.

Four vector autoregression (VAR) models were built, one per FRD, of TBILL, FCL, OOL, and LTM (see Box on Models). Each of these VAR models included a separately determined number of lags of TBILL, FCL, OOL, and LTM. Following model parameter estimation, each model was shocked with a decline in TBILL of 100 basis points. Each point of an interest rate equals 100 basis points, such that 3.7 percent is equivalent to 370 basis points. A 100-basis-point TBILL decline, rather than an increase, emulates recent declines in Federal Government borrowing costs. To the extent that dynamic regularities embedded in the data do not differ significantly from what is currently occurring in the economy, past regularities can be used as a benchmark for characterizing how agricultural interest rates might react to a TBILL decline.

Dynamic quarterly response patterns in the agricultural interest rates (FCL, OOL, and LTM) for each district were examined. Results are presented graphically in figure F-1. The four rows of figure F-1 presents the impulse responses generated by the Chicago, Dallas, Richmond, and Kansas City models, respectively. The three columns of figure F-1 present the impulse responses in feeder cattle loan, other operating loan, and long term mortgage rates, respectively. The plotted points are *not* agricultural loan rates. Rather, they represent changes in these rates, valued in basis point terms. Comparing panels

across rows provides intra-district responses for different agricultural rates. Comparing panels along a column provides the inter-district responses in a particular agricultural rate. Results presented below pertain to the dynamic aspects (i) through (v).

Although TBILL was assumed to decline, the models could have been shocked with a TBILL increase. The “response cycle or duration” is the number of quarters that impulses are statistically nonzero. “Early on in the cycle” and “later on in the cycle” refer to the beginning and later portions of the response cycle for an agricultural rate.

Reaction Times (Dynamic Aspect i).

Reaction times have historically been constant across the three rates within each of the four districts although they vary across districts. Kansas City’s agricultural interest rates began responding to a TBILL change during the same quarter as (within 89 days of) the TBILL change. All other districts had agricultural interest rates that began responding a full quarter after the TBILL rate movement. This casts some doubt on the hypothesis that all agricultural interest rates respond instantaneously to changes in TBILL.

The quarterly, rather than monthly or daily, periodicity of the available data precludes a more precise determination of reaction times. Given exactly where in a quarter an event-specific shock in TBILL should occur, the “immediate” Kansas City responses could occur anywhere from 1 to 89 days of the TBILL decline, while the “one-quarter” reaction time could be anywhere from 90 to 179 days of the TBILL shock. Evidence suggests that the Kansas City agricultural rate responses to a TBILL change were more rapid than analogous responses in the Chicago, Dallas, and Richmond Districts. This also suggests that borrowing costs decline more rapidly in the Kansas City FRD when TBILL falls. The faster response in the Kansas City District may well be related to the heavier concentration in agricultural lending by banks included in the Kansas City sample.

Direction and Patterns of Agricultural Rate Responses (Dynamic Aspect ii).

The FCL and OOL are “shorter term” rates and LTM is a “longer term” rate. In each district, the shorter term rates have historically responded in a similar fashion. Across the four districts, however, patterns of short term agricultural rate responses have been dissimilar.

The shorter term rates in the Chicago, Dallas, and Richmond districts have exhibited response patterns that are similar in some respects. These responses fluctuate in strength toward the response cycle’s end. The short term rates in Kansas City have taken on response patterns that have historically differed from those in the other districts. Compared with short term rate responses in other districts, those in Kansas City:

- (1) have not fluctuated as much in size;
- (2) have been less pronounced earlier on in the response cycle and;
- (3) have generally accelerated in strength, and been more pronounced later on in the response cycle.

So while Kansas City’s rate response patterns have smoothly accelerated over the response cycle, those in the remaining three districts have fluctuated in size early in the cycle, and decayed toward zero near the end of the cycles. Kansas City has experienced less volatile interest effects in the agricultural credit markets than the Chicago, Dallas, and the Richmond Districts.

The longer term mortgage rate response patterns differed least across districts. LTM impulse declines in all four regions generally started at low levels, accelerated in strength, and ended at more pronounced magnitudes. Kansas City’s LTM responses, however, did not vary as much in magnitude during the response cycle as did those of the other districts.

Kansas City was the only district where the LTM response patterns have been historically similar to patterns taken on by FCL and OOL (the shorter term rate) responses. In the other three districts, the pattern of the longer term mortgage

rate responses was less pronounced early, and more pronounced later.

Agricultural Rate Response Durations (Dynamic Aspect iii)

The Chicago District had responses that began a quarter after the TBILL shock, and endured through quarter eight—a duration of seven quarters. Rate responses in the Kansas City District endured, on historical average, for seven quarters, having commenced within the same quarter as the TBILL rate change, and having endured through the seventh quarter.

In the Dallas District, feeder cattle and other operating loan rate responses have historically endured for six quarters, typically beginning the quarter following the TBILL shock, and lasting through the seventh quarter following the shock. The LTM rate in the Dallas District has typically lasted a quarter longer (seven quarters, total).

In the Richmond District, agricultural rates have typically taken on less enduring response patterns: five to six quarters. Richmond interest rates have taken a full quarter to respond to a TBILL change, and have then endured through the sixth or seventh quarter.

TBILL movements have influenced agricultural credit rates for different time periods in the four districts. Average response patterns lasted longest in the two “Midwest” regions (Chicago and Kansas City FRD’s), and lasted least in the “South and South-Atlantic” regions (Richmond and Dallas FRD’s). TBILL movements have historically elicited agricultural rate impulses that have endured from seven to eight quarters in the Chicago and Kansas City Districts. Agricultural rate responses endured for a shorter period of six to seven quarters in the Dallas District, and for five to six quarters in the Richmond District.

Strength Levels of Impulse Responses (Dynamic Aspect iv)

Dynamic multipliers for each rate in each district indicate the strength of an FRD’s agricultural interest rate response to TBILL movements. These

Figure F-1--The Kansas City Federal Reserve District Had The Most Immediate and "Smoothest" Impulse Response Patterns to Changes in T-Bill Rates

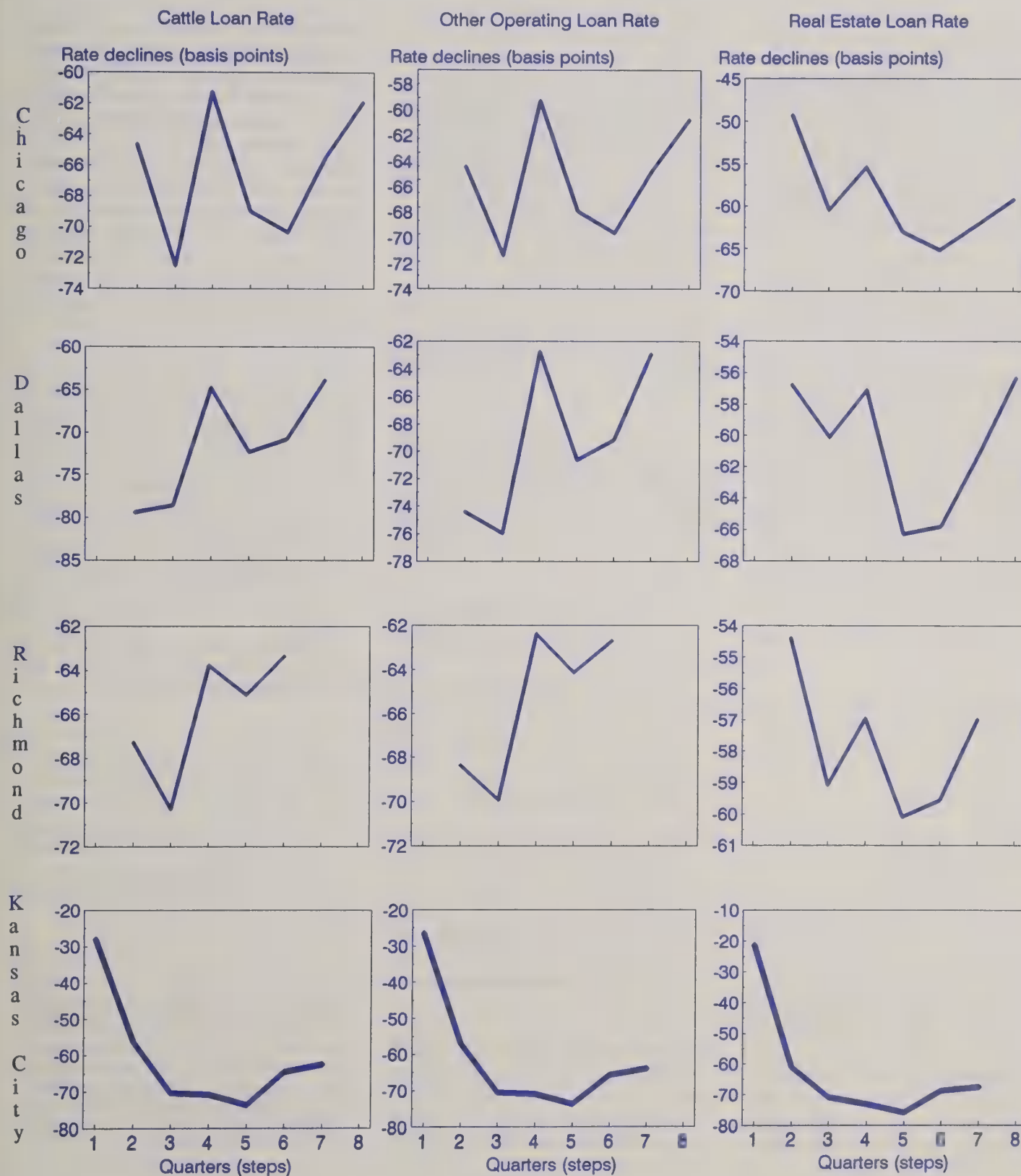


Table F-1--Agricultural rate response, in basis points, per basis point change in the T-bill rate 1/

Federal Reserve district	Agricultural loan rate responses		
	Feeder cattle	Operating	Long-term mortgage
	Basis points		
Chicago	0.77	0.76	0.68
Dallas	.80	.77	.72
Kansas City	.63	.64	.65
Richmond	.65	.65	.60

multipliers, provided in table 1, are all positive, meaning that agricultural rates have tended to move along with T-bill rates in the same direction in the long run. These multipliers capture the long run average response in the rate experienced per basis point change in TBILL. For example, each basis point decline in TBILL has historically elicited 0.77 of a basis point decline in the Chicago FCL and 0.65 of a basis point decline in Richmond's FCL.

The multiplier magnitudes were similar across a district's rates. On average historically, each basis point change in TBILL elicited agricultural interest rate responses that ranged from 0.68 to 0.77 of a basis point in the Chicago District; from 0.72 to 0.80 of a basis point in the Dallas District; from 0.63 to 0.65 of a basis point in the Kansas City District; and from 0.60 to 0.65 of a basis point in the Richmond District. All but one of the twelve ranged from 0.63 to 0.80, and all were less than unity.

Policymakers and analysts may find these multipliers useful. They are based on evidence and dynamic regularities embedded in the sample histories of the modeled interest rates.

Summary, Conclusions, and Policy Implications

Reaction times and patterns of agricultural interest rate responses differed across districts, and such differences must be explained. Are Kansas City's agricultural lenders more in tune with national credit conditions? Are the rate response lags of the other districts relative to Kansas City due to differences in the structure of the agricultural sectors or the agricultural banking industries? Unfortunately, the models used in this

study can only provide statistically significant evidence on the interaction between interest rates across FRD's. These models cannot provide statistically conclusive evidence on factors explaining observed inter-district differences in regularities. Several plausible conjectures explaining observed differences are ventured below:

- Regional response dynamics may differ due to relative levels of competitiveness of the industry across FRD's.
- Dynamics may also differ when the demand for loans differs across districts. For instance, when loan demand is relatively low, bankers in an FRD may be reluctant to transfer an interest rate increase to borrowers.
- Do differences in reaction times suggest that agricultural lenders follow some form of FRD price leadership, where lenders in certain FRD's base their rates on those charged in another district? (With data available for four FRD's, conjectural possibilities as to the "price leader" are at best limited.)
- Structure of agricultural production may influence "stickiness" of interest rates in some regions.
- Differences in the data collection process across FRD's may account for differing rate response patterns across FRD's (see box on data).

Some implications emerge from a study of response patterns for the shorter term rates (FCL and OOL). Because Kansas City's rate responses start the response cycle at less pronounced levels and then

gain strength toward the cycle's end, a Kansas City FRD farmer will experience a TBILL reduction effect more gradually. In the other three districts, the response pattern implies that interest rates will fall more during the earlier parts of the cycle.

Furthermore, historical response durations differ across regions. Richmond agricultural rates take less time—five to six quarters—to "play out" after a TBILL movement, while rates in the other regions take from six to eight quarters. This means that Richmond farmers will feel a reduction in the economy's interest rates for a shorter duration than farmers in the other districts. For a rise in interest rates, this implies that legislators have less time to assist Richmond FRD borrowers than those in the Chicago, Dallas, and Kansas City areas.

Multipliers were greatest in the Chicago and Dallas Districts, where each point change in TBILL has elicited agricultural rate responses of 0.68-0.77 basis points and 0.72-0.80 basis points respectively. In contrast, multipliers range only from 0.60 to 0.65 in the Kansas City and Richmond Districts. This implies that farmers in Kansas City and Richmond experienced smaller credit cost rises from TBILL increases, and smaller credit cost reductions from TBILL declines, than farmers in the Chicago and Dallas FRD's.

For whatever reasons, the historical models of interest rate data reject the hypothesis that rates respond immediately and similarly to TBILL movements across FRD's. More research can clarify whether these discrepancies stem from market structure differences or differences in data collection procedures.

¹ Respectively, Agricultural Economist, Agricultural Economist, and Visiting Scholar, Economic Research Service, USDA. Helpful comments from Greg Gajewski, ERS, USDA, and Nick Walhaven at the Board of Governors of the Federal Reserve System are gratefully acknowledged. Ted Covey of ERS assisted in collecting the data.

About the Models

A quarterly vector autoregression (VAR) model was built to summarize how T-bill rates (TBILL), feeder cattle loan rates (FCL), other farm operating loan rates (OOL), and long-term real estate mortgage rates (LTM) have moved together historically in an FRD. Four such models, one each for the Chicago, Dallas, Kansas City, and Richmond Districts, were built.

VAR econometrics involves a multivariate system where each of a system's variables is allowed to influence itself and every other variable in the system with lags. Four VAR models of the following form were estimated for the Chicago, Dallas, Kansas City, and Richmond Districts:

$$\begin{aligned} x(t) = & a_{x0} + a_{x1}(1)*TBILL(1) + \\ & \dots + a_{x1}(k)*TBILL(k) \\ & + a_{x2}(1)*FCL(1) + \\ & \dots + a_{x2}(k)*FCL(k) \\ & + a_{x3}(1)*OOL(1) + \\ & \dots + a_{x3}(k)*OOL(k) \\ & + a_{x4}(1)*LTM(1) + \\ & \dots + a_{x4}(k)*LTM(k) \\ & + e_x(t) \end{aligned}$$

Above, $x = TBILL, FCL, OOL, LTM$. The a -coefficients are ordinary least squares parameter estimates. The coefficient with a "0" subscript is an intercept. The other a -coefficients have two subscripts. The x -subscript denotes the equation within each VAR to which the coefficient belongs, while the numerical subscript denotes the relevant set of lagged rates. The subscripts 1, 2, 3, and 4 are paired with the rates TBILL, FCL, OOL, and LTM respectively. The parenthetical terms are lags, with "t" representing the current period and with k representing the k th lag from period t . The $e_x(t)$ term is equation x 's current stochastic, white noise error term. Each district therefore has one four-equation VAR model of the four interest rates. Limited degrees of freedom precluded combining all regional agricultural interest rates into one VAR model.

Rates prior to first quarter 1976 on other agricultural loan types and for more Federal Reserve districts were not available without encountering problems with missing values. The 1976:1-1976:4 observations were set aside for Tiao and Box's lag selection procedure, leaving 1977:1-1991:1 for the period of estimation. The Tiao-Box likelihood ratio test results sug-

gested two lags for the Dallas and Richmond models; three lags for the Chicago model; and four lags for the Kansas City model.

Each model was shocked with a 100-basis-point drop in the T-bill rate. A T-BILL decrease was arbitrarily chosen as the shock because lately, interest rates have been declining. Results presented are still valid for a T-BILL increase, as the VAR models are linear. For impulse responses from a 100-basis-point TBILL increase, one need only multiply the negative impulse responses presented by negative one.

Further, the 100-basis-point TBILL decrease serves as a conveniently sized TBILL shock. Because the models are linear, one need only scale the impulses from the 100-basis-point TBILL shock by a scalar to obtain impulses for a differently sized shock. A differently sized TBILL shock would present the same patterns of impulse responses; only the scales of the plotted axes would change.

The impulse responses reported in figure 1 were statistically nonzero at the 1-percent significance level.

About the Data

The data employed in the study are obtained from quarterly surveys conducted independently by Federal Reserve District Banks. These data were available for a sample of commercial banks in each of the following Federal Reserve Districts: the Chicago (7th), Dallas (11th), Kansas City (10th), and Richmond (5th) Districts. These data are published collectively in the quarterly *Agricultural Finance Data Book* by the Board of Governors of the Federal Reserve System.

The method of sampling differs between Districts in important ways. For example, the Kansas City FRD includes in its sample only banks that have over 50 percent of their total loans as agricultural loans. The national unweighted average for this ratio is about 16 percent. Thus, the Kansas City sample represents a group of very undiversified lenders. This indicates the potential for differing management behavior regarding setting of agricultural interest rates. Chicago samples banks with a 25-percent ratio, while Dallas and Richmond sample banks where agricultural loans are "relatively important."

Important differences exist in the nature of the Federal Reserve Districts themselves, both in terms of agricultural production and banking structure. The Dallas and Kansas City Districts are heavily populated by independent banks with limited branching activity, which differs from the other two Districts. The Dallas District was heavily influenced by events in the energy sector in the 1980's with Kansas City being less influenced and Chicago and Richmond little, if at all. The Districts also differ in the degree to which feeder cattle are a factor and agricultural real estate lending is important to banks.

Determinants of Short-term Agricultural Loan Rates at Commercial Banks

Paul A. Sundell¹

Abstract: Agricultural loan rates more closely follow money market interest rates because of financial deregulation. This paper examines determinants of short-term agricultural loan rates at small and large banks. Empirical support is found for the view that short-term agricultural bank loans are determined in part on an average cost of funds basis while large banks price agricultural loans on a combination of their marginal and average cost of funds basis. In addition, farmer default risk and lender willingness to bear risk unique to agriculture are more important to the determination of small bank agricultural loan rates. Variation in general business risk was found to have a greater impact on agricultural loan rates at large commercial banks than at small agricultural banks.

Keywords: Cost of funds, unique risk, prime rate, large certificate of deposit rate.

Financial Deregulation Caused Agricultural Interest Rates To Follow General Credit Conditions

Interest rates charged by banks to farmers are an important determinant of farm interest expense. Farm loan rates are affected by many factors, most of which are not directly related to developments in the agricultural sector. For example, recent declines in the overall level of interest rates will affect bank rates facing farmers, but the decline is the result of the national recession rather than farm-specific developments.

Financial deregulation during the 1980's affected the relationship between the rates that banks must pay to acquire funds and the rates that banks charge their agricultural borrowers. Deregulation began in 1978 when banks began to issue money market certificate accounts, and continued through the eventual phaseout of interest rate ceilings by the Depository Institutions Deregulation and Monetary Control Act of 1980, and the Garn-St. Germain Depository Institutions Act of 1982. One result of deregulation is that interest rates banks must pay to acquire funds are more closely related to other market interest rates, which has increased rate volatility. As a consequence, interest rates paid by farmers have become more related to other market interest rates and their volatility has also risen.

Figures G-1 and G-2 show the increased correlation of rates on short-term agricultural loans (excluding those backed by real estate) and money market rates. The relationship between the prime and

the small bank agricultural loan rate is much stronger since 1982. Some financial economists argue that—at least for typical urban midsize or larger banks—the prime rate reflects the bank's average cost of short-term funds already on its balance sheet. Therefore, movements in the prime tend to lag behind

movements in the current or marginal cost of acquiring new bank funds.

The Relationship Between Agricultural Rates and General Interest Rates

Financial deregulation during the 1980's narrowed the difference in the

Figure G-1--Composite Small Bank Short Term Farm Loan Rate and the Prime Rate

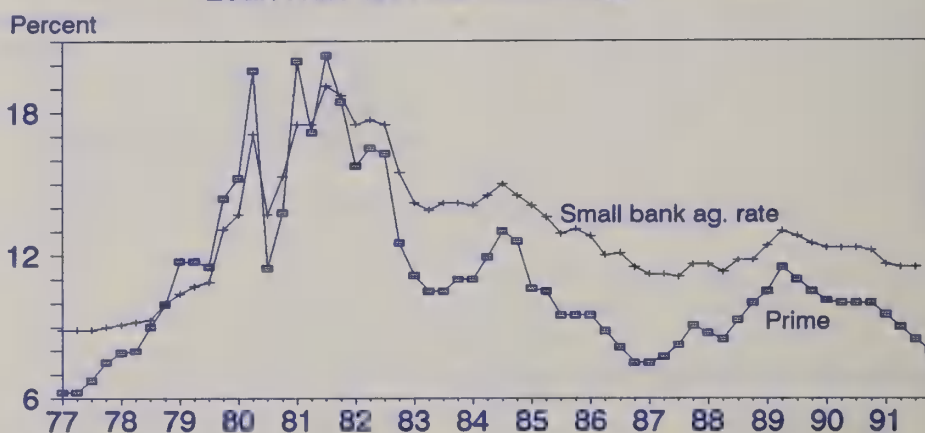
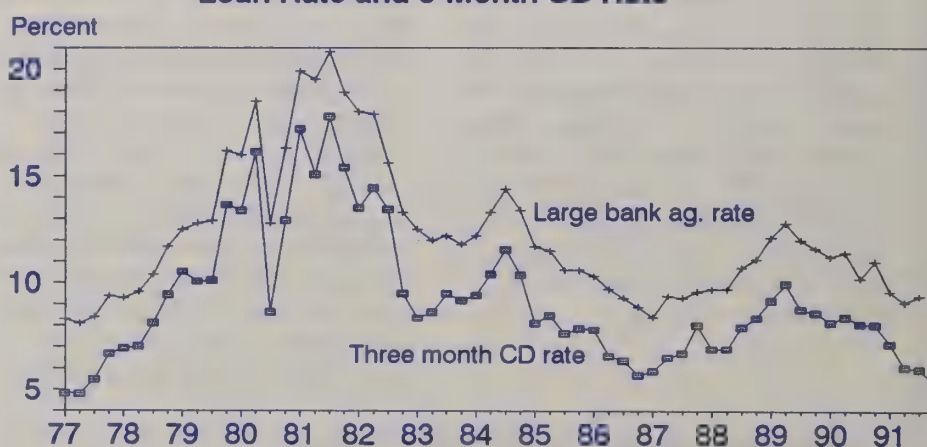


Figure G-2--Composite Large Bank Short-Term Farm Loan Rate and 3-Month CD Rate



costs of acquiring funds for different types of banks. Therefore, if small banks base their agricultural loan rates more on the average cost of funds, short-term loan rates at agricultural banks are likely to more closely follow the prime. Another linkage between the prime rate and rates facing agricultural borrowers is the increased use of variable rate loans by small banks in the 1980's. Many of these loan rates are indexed to the national prime.

Figure G-2 shows the relationship between short-term agricultural loans at large banks (over \$500 million in total assets) and the rate on large (over \$100,000) negotiable 3-month certificates of deposit (CD). The large CD rate is a measure of a large bank's marginal cost of funds. Large banks typically have greater access to national money markets and typically make larger loans to larger agricultural borrowers, who generally have access to more banks than small borrowers. Therefore large banks tend to base their lending rates to their large borrowers more on the marginal cost of bank funds.

What Determines Bank Lending Rates

In determining how much to charge for a loan—its loan pricing decision—the bank must cover the basic costs involved in the loan. These include the

Table G-1--Small bank and large bank short-term nonreal estate farm loan regressions, 1982-1990

	Small banks	Large banks
Constant	-0.244 (-0.31)	1.995 (2.05)
Prime rate	0.624 (6.14)	0.514 (2.75)
3-month CD rate	-0.024 (0.24)	0.512 (2.80)
Ratio of farm debt to farm assets (market value)	0.240 (6.36)	-0.007 (-0.186)
Return on bank equity (prev. year)	0.174 (6.23)	-0.001 (-.046)
Spread BAA-AAA industrial bonds	0.159 (1.09)	0.362 (1.47)
Percentage of loans contracted at a fixed rate	0.719 (1.28)	-2.351 (-3.64)
Adjusted R ²	.986	.969
Std. error	.211	.390
Durbin-Watson	2.09	1.81

t-statistics are in parentheses.

bank's cost of funds, the transaction costs involved in the loan, and a portion of its overhead costs. In addition, it will need to charge for the possibility and costs of potential borrower default. Finally, the bank will demand compensation for the risk the loan contributes to the bank's overall asset portfolio.

Loan rates may also vary depending upon other factors including compensating balance requirements on borrowers, loan fees, collateral requirements, equity requirements, size of loan, and borrower capital structure. Smaller banks specializing in farm lending may monitor farm customer loan needs more closely or provide other worthwhile services to the customer that influence final loan terms. Larger banks may have cost advantages in providing bank services that may reduce the overall overhead charges on loans. However, the issues of efficient bank size and the relatively magnitude of cost efficiencies is still uncertain despite many studies (Evanoff and Israilevich). Bank risk aversion and bank capital structure will also influence final loan terms.

The Cost of Bank Funds

Banks may price their loans based on their average or marginal cost of funds. In some cases, both borrowers and lenders may benefit from an average cost of funds approach. For borrowers, loan rates determined by the bank's average cost of funds may be less volatile. For banks, when changes in average interest rate expenses are immediately reflected by an exact change in average interest earnings on their loan portfolio, average cost pricing will help hedge the banks' net worth exposure to interest rate changes. Variable rate loans tied to an index that approximates banks' average cost of funds, such as the national prime or its own index of average funds costs, were very popular for farm loans in the 1980's.

In markets where there is aggressive competition among banks for loans, loans rates tend to be determined more by the marginal cost of bank funds. Therefore, borrowers with access to many banks and who are willing to accept somewhat more volatility in their loan costs may find that long-run borrowing costs are lower. Credit surveys

indicate larger banks tend to make relatively greater use of marginal rate pricing in determining their agricultural loan rates.

Risk

The riskiness of the loan relative to the bank's loan portfolio will be an additional determinant of the loan rate. The two major sources of individual loan and portfolio risk premiums are default risk and interest rate risk. The default risk premium is the additional expected return above the default-free rate (Treasury yields) the bank demands for bearing default risk. The interest rate risk premium compensates the lender for the risk that the value of the asset (in this case a loan) will decline if interest rates rise. Individual and portfolio asset interest rate risk can be reduced through the use of variable rate lending as well as interest rate hedges such as interest rate futures and options.

Loans that are strongly correlated with returns to the bank's loan portfolio will be charged a premium. In general, banks that do not hold diversified loan portfolios will be subject to greater portfolio risk. Because undiversified loan portfolios increase the risk of volatile earnings and bankruptcy, bank stockholders will typically demand higher expected returns on the equity of relatively undiversified banks.²

Therefore, banks with undiversified loan portfolios are forced to charge higher loan rates to achieve higher long-run returns for their stockholders. Many small agricultural banks typically have fewer opportunities to diversify risk and therefore may be forced to charge somewhat higher loan rates for similar loans than their larger, more diversified banking counterparts.

In addition to setting loan rates based on returns on comparable risk-free securities, default risk, and portfolio risk, banks may use credit rationing to control risk. As real borrowing rates rise above a critical point, the probability of borrower default may rise significantly, thus lowering the loan's expected return. Therefore, in times of greater concern over loan quality, the relative proportion of new high-quality loans in the loan portfolio may increase. As a re-

sult, fewer new loans made to high-risk borrowers, credit rationing may lead to a fall in average loan rates as long as loan rates facing high-quality borrowers remain relatively constant.

Preliminary Econometric Findings

The empirical importance of the above factors was examined using multiple regression analysis. Equations were fit for the composite bank short-term loan series for both large and small banks found in the *Agricultural Finance Data Book*.³ Loan rates based on loan terms for the first week of the second month of the quarter.

The following explanatory variables were used. The average 3-month CD rate for the first month of the quarter is used to measure the marginal cost of bank funds. The national prime rate in the first month of the quarter measures the average cost of bank funds. The market value ratio of total farm debt to total assets is a measure of default risk in farm loans. General business risk is measured by the spread between BAA and AAA industrial corporate bonds.

The previous year's rate of return on equity (ROE) for agricultural banks and all commercial banks is used to account for the impact of credit rationing or changing interest margins at small and large banks on their short-term agricultural lending. A large return on bank equity in the previous year indicates relatively high bank interest margins, greater loan fund availability, and more willingness to expand credit to marginal risky borrowers. The impact of variable rate loans on agricultural lending was measured by the percentage of fixed-rate short-term nonreal estate farm loans. This variable picks up the average bank charge for short-term fixed rate loans. The regression results are shown in table G-1.

Costs of Funds Variables

The regressions indicate that the relevant cost of funds variables are, as expected, the most important determinants of short-term agricultural loan rates at large and small banks. For the small bank equation, the econometric evidence clearly indicates the prime rate is

the relevant cost variable. Econometric evidence by Brady and Goldberg (1984) indicates that the prime rate fully responds to an increase in the large CD rate with a 2- or 3-month lag. The exact lag shape will depend on factors such as bank loan demand and competitive pressures from bank and nonbank lenders.

Given the relatively larger and more significant coefficient for the prime rate in the small bank regression and the insignificance of the 3-month CD rate in the small bank regression, the results indicate average cost of funds pricing is more important for small banks in pricing short-term agricultural loans. On the other hand, both the 3-month CD rate and the prime rate were significant for the large bank rate equation, suggesting that both marginal and average costs are important in determining lending rates at large banks.

Risk Variables

The farmer default risk variable (last year's percentage of farm debt to assets at market prices) was highly significant for small banks but insignificant for the large bank. Because small agricultural banks typically have a greater proportion of their loan portfolio in agricultural loans, and are also less diversified overall, they are likely to be more sensitive to agricultural default risk.

On the other hand, large banks, because of their lower exposure to the agricultural sector, are likely to view agricultural loans as a way to diversify their loan portfolio and are not likely to be as sensitive to risks unique to the agricultural sector.

The coefficient on the previous year's rate of return on bank equity for agricultural banks was highly positive and significant in explaining farm loan rates at small banks. Neither of the coefficients on the return on agricultural bank equity or overall large commercial bank equity was significant in determining agricultural loan rates at large banks. The result is consistent with the view that the willingness to make higher-risk farm loans varies more at small banks than large banks over time. When relatively more high-risk agricultural loans are made, the composite small bank short-

term agricultural loan rate may increase, reflecting the greater proportion of higher-risk loans.

No evidence of significant interest rate risk term premiums was found for either small or large banks. The significant negative coefficient on the percentage of loans at fixed rates at large banks may reflect the tendency of very short-term loans to low-risk borrowers to generally be made at fixed rates. Financially strong large farm borrowers may be able to obtain very short-term fixed rate loans at relatively low rates. Given the relatively fewer agricultural loans made by large banks, a few very large fixed rate short-term farm loans may have a significant impact on the aggregate agricultural rate at large banks.

Preliminary results indicate that general business risk as proxied by the corporate bond spread may influence agricultural loan rates at large banks more than small banks. When all the statistically insignificant variables were dropped from the large bank equation, the bond spread variable was nearly significant at the 10-percent level, while it was consistently not significant in the small bank regressions.

One explanation for the larger coefficient for the spread variable in the large bank case is that large banks may price their loans more on their relationship with general business risk. If agricultural risk is somewhat correlated with general business risk, increased business risk may push agricultural loan rates at large banks somewhat higher. The addition of other explanatory variables such as average loan size, average loan maturity, and last year's return on agricultural equity was found to not be significant for the small and large bank loan series.

³ Agricultural economist, Economic Research Service, USDA

² Stockholders of smaller undiversified banks are especially likely to demand a larger expected return on the bank's stock if transactions costs make it costly for the stockholder to diversify away the undiversified risk of the bank. In this case, stockholders of relatively undiversified banks are likely to demand a premium to hold these bank's stocks to compensate them for the cost in diversifying away the bank's unique risks. This analysis assumes that the shareholders of small undiversified banks typically hold a relatively diversified portfolio of other assets to minimize the impact of the bank stock's unique risk on their overall portfolio risk.

³ A more detailed discussion of the breakdown of small and large bank in terms of agricultural lending may be found in any issue of the *Agricultural Finance Databook or Survey of Terms of Bank Lending (Loans to Farmers)* both published by the Board of Governors.

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Managing Farm Lender Interest Rate Risk with Financial Futures

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Abstract: Unpredictable interest rates mean financial risk for farm lenders. The greater the unpredictability, the greater the probability of financial loss. Interest rate risk can be reduced by transferring part of that risk from the farm sector to speculators in the financial futures market.

Keywords: volatility, interest rate risk management, financial futures.

Interest rate risk may be thought of as the degree of unpredictability concerning the future level of interest rates. The greater the unpredictability, the less control a lender has over the outcome of financial decisions. Volatility or variability may be thought of as a measure of the degree of unpredictability.

Deregulation of financial markets is one source of interest rate volatility. Historically, ceilings were placed on the interest rates that financial institutions could pay to depositors. With maximum rates, the level and variability of interest rates were limited. Likewise, State usury laws controlled the maximum interest rate that lenders could charge borrowers. A fundamental change in interest rate regulation occurred with passage of the "Depository Institutions Deregulation and Monetary Control Act of 1980." This act temporarily preempted State usury ceilings and mandated the gradual elimination of the interest rate control on deposits. Increases in the level and variability of interest rates soon followed.

Another source of interest rate volatility occurred with the integration of the Nation's urban and rural financial markets beginning in the late 1970's. Rural savers gained access to higher yielding investment alternatives, forcing farm lenders to replace their relatively less costly demand deposits with more costly sources of funds, reducing bank profit margins.

Changes in the macroeconomic environment have also increased interest rate volatility. Responding to negative real rates, the Federal Reserve Board (Fed) in 1979 shifted from a policy of controlling interest rates to controlling growth in the Nation's money supply. The result was a rapid increase in both interest rate levels and volatility. Since 1982, the Fed has emphasized other tar-

gets and interest rate volatility has been reduced.

Fiscal policy also may have acted to heighten interest rate uncertainty. The increase in inflationary expectations due to highly stimulative fiscal policy resulted in increasingly volatile interest rates. One theory (called the "crowding-out" effect) holds that large Federal budget deficits create additional demand in credit markets through Government borrowing, thereby increasing real interest rates. However, empirical research has shown little evidence in support of this position (Chrystal and Thornton).

Managing Interest Rate Risk

Farm lenders have portfolios consisting of assets and liabilities with varying degrees of interest rate sensitivity. Financial service institutions profit by lending at higher interest rates than they borrow. Earnings are decreased when borrowing rates come closer to lending rates. The combination of interest rate sensitivity and interest rate volatility can adversely affect a lender's net cash flow and net worth positions. This is particularly true when borrowing short-term at variable rates while lending long-term at fixed rates. Although interest rate volatility has dampened since 1982, lenders must know how to cope with future interest rate risk.

Lender asset/liability management involves controlling the gap between interest rate sensitive assets and liabilities. "Gap" refers to the difference between the durations (average life) of the lender's assets and liabilities. A negative gap occurs when lenders fund long term fixed rate loans with relatively shorter-term liabilities.

Prior to the 1970's, a negative gap position was traditional for lenders, result-

ing in fairly stable profits during a period of stable interest rates and a normal yield curve. However, these negative gap positions proved particularly risky for lenders during periods of volatile interest rate activity. This was because net interest rate margins tend to narrow as interest rate levels increase (Leatham).

Lending involves predicting uncertain interest rate movements. A lender with a fixed rate loan with a duration longer than the duration of a variable rate funding source is betting that interest rates will not rise more than expected. Because the expected rise in rates is built into the lender's spread between loan rates and cost of funds, an unexpected change in rates can cause interest rate risk. Unexpected changes that reduce interest rate spreads lower lender profits.

Increasing interest rate volatility increases the risk that results when mismatching interest rate sensitive assets and liabilities. Greater interest rate volatility results in portfolio substitution away from assets that are higher yielding but riskier. Increased interest rate volatility results in increased volatility of prices for rate sensitive financial instruments such as mortgages and bonds. Increased price volatility creates additional risks to the holders of these instruments as well as potentially profitable opportunities for speculators. Because lenders are risk averse, they are interested in transferring at least part of this risk to speculators.

To minimize the risks of financial transactions based upon interest rate predictions, different risk management techniques have been applied: (1) matching the duration of assets and liabilities, (2) swapping debt in accordance with the balance sheet characteristics, (3) substituting variable for fixed rate loans, (4)

reducing loan maturities, (5) using options, and (6) using futures. The cost of these different techniques is the foregone opportunities from favorable interest rate movements.

The first four alternatives seek to redistribute or shift risk among the lenders, borrowers, and savers within the farm sector. Interest rate futures and options allow the farm financial sector to shift part of its interest rate risk to that part of the nonfarm sector (for example, futures market) that is willing to bear the risk.

Financial Futures

Futures contracts are legally binding agreements to buy or sell a specified asset of a particular type and quality, in a specified amount, to be delivered to a specified location at a later specific period. Future contracts exist for numerous agricultural commodities (wheat, soybeans, hogs, etc.), metals (gold, silver, etc.) and financial instruments (Treasury bills, Treasury bonds, etc.). They are bought and sold at a futures exchange, such as the Chicago Mercantile Exchange, by members of the exchange for either their own account or for someone else.

Futures contracts are written for a particular delivery period in a particular month and expire on the last day of that period. Less than 2 percent of all contracts end in delivery (for example, sale and purchase of the asset). Most contracts are offset through an equal but opposite trade by the buyer or seller.

A futures price is the price negotiated between a buyer and seller for a particular futures contract. Each exchange sets limits on how much a futures price is allowed to change from day to day. This range is based upon the previous day's settle price plus or minus a specified amount set for each asset.

Futures market transactors are required to put up a "good-faith" deposit (called an initial margin) that is equal to a certain percentage (5-10 percent) of their futures position. If the futures price moves unfavorably with respect to their position reducing their margin below a certain maintenance level, they are required to add money to return their margin to its original level. This is referred

to as a margin call. Margins are returned to the trader when the futures position is eventually offset.

Traders who buy and sell on an exchange are usually described as speculators or hedgers. Speculators are generally motivated by a desire to profit by their superior ability to predict the direction of futures prices. They buy (go long) futures contracts if they expect the futures price to increase from its present level. They sell (go short) if they expect the futures price to decline over time. They profit if their predictions prove true, and gains exceed their transactions costs (costs of doing business, such as the search for profitable opportunities, paying brokerage fees, and taxes).

Hedgers are those who enter a futures market with the desire to reduce their already existing risk in the cash market (either commodity or financial). There are two basic types of hedgers, the long and short hedger. They may be buyers or sellers in the commodity markets, or borrowers or lenders in the financial markets. Hedgers attempt to transfer part of their preexisting risk in the cash markets to those in the futures markets willing to bear that risk. Hedging involves a cash trader (e.g., a borrower or lender) assuming a position in the futures market that is opposite to their position in the cash market.

Hedging substitutes basis risk (uncertainty regarding the subsequent difference between the futures and cash prices) for cash price risk (uncertainty regarding the subsequent cash price when a business transaction is to be consummated later). Basis risk can arise from many sources such as using a cross hedge, maturity mismatching, and denomination mismatching. Hedging can successfully reduce interest rate risk because the variability in the basis is generally much less than variability in either the cash or futures price.

Interest rate futures contracts were introduced on October 20, 1975, and have come to represent about one-half of the entire futures industry. Almost all of the trading in interest rate futures is done on two exchanges, the Chicago Board of Trade (CBOT) and the International Monetary Market (IMM) of the Chicago Mercantile Exchange. The

most actively traded contracts are for T-bonds, the three T-notes (2-, 5-, and 10-year), municipal bonds, T-bills, and Eurodollars. These differ widely in their contract terms and maturities. Unlike other futures contracts, there is no daily price limit for T-bill futures.

The choice of which contract to use as a hedging instrument depends upon the financial instrument in the cash market one possesses. Generally, the more similar the cash and futures instruments in type, denomination size, and delivery period, the more successful the hedge.

In a direct hedge, the types of cash and futures instrument are identical. In a cross hedge, the types of futures and cash instrument is different. The basis is less volatile (more stable or predictable) for a direct hedge than a cross hedge.

As an example of a direct long hedge, suppose a lender will receive \$1 million in 2 months to invest in T-bonds. The lender expects interest rates to decline between now and then. For simplicity, assume there are no transaction costs or margin requirements. The lender buys 10 T-bond futures contracts (\$100,000) in September quoted at 85-00 (points and 32nds of par). In other words, with a par value of \$100,000 per contract, the cash price would be \$85,000. Assume the same bonds were available in the cash market for 84-00.

Suppose that by November interest rates have declined as expected. T-bonds (8 percent) now sell for 89-00 in the cash market and 90-00 in futures. The lender sells the 10 futures contracts and makes the cash market investment that was anticipated. The opportunity loss of \$50,000 in the cash market was offset by a gain of \$50,000 on the futures transaction.

Farm Lenders and Financial Futures

Lenders use futures to: (1) protect the value of their portfolio; (2) guarantee a future borrowing rate; and (3) guarantee a future lending rate. For the first two, a short hedge would be placed to guard against an unexpectedly higher interest rate. For the third, a long hedge would

be placed to protect against a lower-than-expected rate.

Portfolio decisions by lenders can be critical to the ability of the lender to withstand periods of financial stress. This is especially true during times of high interest rate volatility. A study by Belognia and Gilbert showed that assuming more risk (higher ratios of loans to assets and farm to total loans) was the distinguishing factor between banks that failed and those that succeeded during 1984-1988.

Lenders may attempt to hedge specific assets or liabilities (called micro-hedges) or hedge their entire balance sheet (called a macro-hedge). Examples of micro-hedges include: (1) the duration match of a particular asset with a particular liability (for example, a 5-year loan funded with a 5-year CD); (2) a fixed rate lender swapping a variable rate debt for fixed rate debt; and (3) the hedging of a fixed rate loan commitment using the futures market. A macro-hedge aggregates the bank's micro-hedges to cover its entire balance sheet (Sinkey).

There are two basic situations which would encourage a lender to micro-hedge (Sinkey). The first is where futures are purchased to lock in a yield on an anticipated cash inflow. Lenders face two choices: wait for the inflow to occur and accept the risk of declining interest rates; or hedge the risk by buying futures if rates are expected to decline (and therefore futures price rise). If interest rates decline as expected, the future cash inflow will be invested at a lower yield. But the opportunity loss in the cash market will be offset by the gain in futures.

Suppose a lender has funds to invest for 6 months and the yield curve is presently inverted. Here, the lender would like to "strip" two 3-month bills to cover the 6-month investment horizon. A "strip" is the combining of two or more successive futures contracts for the same asset. The risk is that short-run rates will decline over the next 3 months. This means that the rollover to the second bill would occur at a lower rate than exists now. Accordingly, the manager hedges long by buying the nearest 3-month T-bill futures contract.

If rates decline, the opportunity loss on the rollover will be offset by the gain when the futures contract is sold. If rates had increased contrary to expectations, the higher yield on the rollover will be decreased by the loss in futures. Leatham showed that strip and rollover hedging can be very effective in reducing the difference between the expected and realized yields on loans.

The second micro-hedge situation involves expected cash outflows, such as future loan commitments and maturing debt that must be rolled over. Again, the decision how to meet these expected cash flows depends upon interest rate expectations. If interest rates rise, the future outflows would be funded by the subsequent higher cost of money. Given expectations of such, lenders would hedge short to lock in the cost at which the expected cash flows would be funded. If rates do rise, the subsequent higher cost of funds would be offset by the gain in futures.

Financial futures offer protection against interest rate risk incurred from a lender's undesirable gap position. Futures can be used to put a macro-hedge in place when duration matching is infeasible because of incomplete financial markets. T-bill futures are one such method of hedging maturity mismatches (that is, a non-zero gap) of rate-sensitive assets and liabilities. To hedge a negative gap against the risk of rising interest rates, T-bill futures contracts can be sold to offset the anticipated decline in lender earnings. To hedge a positive gap against the possibility of declining rates, T-bill futures contracts could be bought. If rates decline as feared, the futures profits would offset cash market losses.

Hedging cannot remove all interest rate risk, only substitute basis risk for it. But because basis risk is smaller and more predictable than interest rate risk, hedging can effectively reduce the variability of portfolio returns, avoiding the substitution to less risky but less profitable assets (Drabenstott and McDonley).

The Farm Credit System (FCS) provides real estate loans through the Federal Land Banks, shorter term operating loans through the Federal Intermediate

Credit Banks (FICB) and Production Credit Associations, and loans to farmer-owned cooperatives through the Bank for Cooperatives. The FCS responds to increasing interest rate risk by using variable rate loans to approximate a zero gap. But this passes the interest rate risk to the farmer-borrowers, meaning the FCS faces higher risk of loan default. Hedging its interest rate risk in financial futures could allow the FCS lender to reduce its overall lending risk by minimizing the variation in its cost of funds and thereby its lending rate.

A study by Heffernan and Lee on data for a regional (Louisville) FICB for the latter half of 1981 showed that hedging with 90-day T-bill futures contracts (a cross-hedge since there are no futures instruments based on FCS bonds) reduced its lending rate from 48 to 77 basis points. Furthermore, by hedging a portion of their debt portfolio, the FCS could offer borrowers fixed rates for at least some specified time period.

Lenders' use of futures has some drawbacks. While small rural lenders have indicated an interest in financial futures, participation in futures involves significant information and human capital costs. Margin calls, as well as the initial margin deposit, increase both lender cost and risk. Whether to hedge in futures or some other interest rate risk management technique (or combination of techniques) must be determined. The proper technique in one period may not be appropriate given a different financial environment. Nor is the same technique appropriate for each lender.

Hedging in futures could even increase a lender's risk exposure, if assets and liabilities are equally affected by changes in interest rates. Here, the portfolio would already be hedged, and taking a position in futures would create a new unhedged position. Hence, it is essential that a lender know how interest rate sensitive its earnings are before attempting any type of hedging program (Keen).

Conclusions

Lenders must act on their expectations of future interest rates. The greater the volatility of these rates, the greater the probability of forecast error, resulting in

reduced profit margins and even financial loss. Financial futures offer farm lenders the ability to respond quickly to a change in their interest rate expectations without restructuring balance sheet items by transferring at least part of that risk out of the farm sector. By protecting lenders against unanticipated changes in interest rates, hedging can reduce income uncertainty by reducing interest cost variability.

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Life Cycle and Expectations of Farmers

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Abstract: Age of farm operators is closely linked with expectations farmers have about their future and the future of their farm, according to a U.S.D.A. survey. Compared to older operators, younger operators were more likely to expect to be combining farming with an off-farm job, to increase the size of their farm, and be undecided about the future of their farm upon their retirement.

Keywords: Life cycle, farmer age, farmer expectations

Many farm business and farm operator characteristics have strong relationships with the operator's age, or life cycle. Life cycle effects, in conjunction with technological change and the numerous external factors affecting agriculture, determine farm size changes and the entries and exits from farming that shape the basic structure of the sector. Two factors underlying the life cycle effects in agriculture are the common way in which capital is accumulated and distributed in agriculture and the tendency for operators to stay employed in agriculture, even enter agriculture, at later stages in life.

Production agriculture is a capital intensive industry, and so how capital is acquired and how much capital is under the control of the operator is a key to financial success. Most commonly capital is accumulated through transfers or inheritance from the previous generation of family members who farm. Capital is also accumulated gradually by a successful operator through savings and investment from current income.² The process of accumulation, and then distribution or consumption at later points in the life cycle, explains the trends in average farm asset values and net worth. Both of these increase until the operator age group of 65 years or older and then decline after that. As age increases, the percent of farmers without debt increases. For the eldest age group, 65 years or older, about 70 percent do not hold any farm debt; Forty percent of all other farmers do not hold farm debt. The trend in income, from all sources, follows this same pattern of increasing and then decreasing with age, except the decline in income starts with the 55-64 age group.

Farming as an occupation is characterized by an unusually large proportion of older operators. For example, 2 per-

cent of the nonagricultural workforce is 65 years old or older. But, over 20 percent of farmers are in that age group. This situation has occurred through the forces affecting both the exiting of farmers from agriculture and the entry of new farmers into agriculture.

Two reasons may account for farm operators staying on the job to an older age than nonfarm workers. First, farmers are self-employed so they may have the flexibility to scale down their operation as their physical capabilities lessen. This tendency is reflected in the relationship between farm size and operator age—older operators are more likely to operate small farms. In addition, older farmers are more likely to run beef cattle operations, which require minimal labor, and less likely to operate cash grain and dairy operations than are younger operators.

A second reason for the large percentage of elderly operators who remain in farming is because the farm is usually the family home. Almost 80 percent of farm operators reside on their farm, and so there is a greater personal incentive to keep the farm in operation. Farmers 65 years and older have been living on their farm for about 30 years on average.

While older operators are more likely to remain in farming than their nonfarm counterparts, potential new, young entrants into farming may be blocked by expectations of bleak financial prospects and the steep start-up costs of farming. Some new entrants are elderly and are beginning a second career as part-time farmers after retiring from nonfarm jobs.

The life cycle of farming plays a role in farmers' expectations about the future. We have examined farmers' expectations as captured in questions from

USDA's 1988 Farm Costs and Returns Survey (FCRS), Farm Operator Resource Version. The FCRS is an annual survey of farm operators designed to be statistically representative of all farms nationwide. The Farm Operator Resource Version of the 1988 FCRS included 2,985 farmer respondents, statistically weighted to represent 1.7 million U.S. farms. The following three questions were asked of farmers about their expectations for the future:

- In 5 years time, do you expect to be farming only, farming and have an off-farm job, or be out of farming altogether?
- In 5 years time, do you plan to expand, decrease, or leave the size of your operation unchanged?
- When you retire, what is going to happen to this operation?

Farmers of all ages chose each of the survey responses, so the relationships between expectations and age are not clear cut. However, by looking at how the farmers are distributed by age for each of the possible responses we can learn about the general tendencies. Farmers' expectations may vary so significantly by size of operation that they are described them separately for small farms (less than \$40,000 in gross farm income) and large farms (\$40,000 or more in gross farm income).

Expectations About Farm and Off-Farm Occupations

Nearly half of all farmers reported that they expected to be farming and not working off their farm in 5 years time, about one-third expected to be combining farming with an off-farm occupation, and the rest expected to be out of

farming altogether. Small-farm operators were much less likely to expect to be farming exclusively, and more likely to be either out of farming altogether or else combining farming with off-farm employment.

The distributions were different by size of farm with respect to expectations of being engaged exclusively in farming. Of those who expected to be only farming in 5 years, operators of large farms tended to be younger than operators of small farms (figure I-1). Regardless of farm size, the expectation for joint farm and off-farm job holding was clearly more strongly associated with younger operators. Expecting to exit farming altogether was more common among older operators.

Expectations About Changes in Size of Operation

More than 60 percent of farm operators expect that the size of their operation will remain unchanged in 5 years. Operators of small farms were more likely than operators of large farms to expect their farm size to remain unchanged and even decline. Expectations about changing the size of the operation with respect to the operator's age were fairly clear cut for both sizes of farms (figure I-2). For both the small and large farms, expectation of expanding the operation were more common among younger farmers. More than 40 percent of farmers under the age of 45 expected to expand their operation within the next 5 years—four times as many as older operators. Age differences between the other two responses were less distinct than for the expectation to expand. The expectation that farm size would not change was slightly more common for the middle-aged operator, and expect-

ing to decrease the size of the operation was a more common response of the older operators.

Expectations About the Farm, When the Operator Retires

About 40 percent of farm operators expected that their operation would be taken over by a family member or current partner, another 20 percent expected to sell or rent the farm, and 40 percent were still undecided about what would happen when they retire. Since younger operators have a longer planning horizon until retirement, being undecided about the future of the farm upon retirement was a more common response of younger operators, regardless of size (figure I-3). Although less common, many older operators expressed uncertainty about their plans for the farm upon their retirement—almost 20 percent of operators 65 years and older were undecided. The operators of small farms who expected that their farm would be operated by other family members or partners were generally older than those who expected that they would sell or rent the operation when they retired. For the larger farms, little difference existed between the age of the operators and their expectations about whether family or partners would take over the operation or whether they would instead sell or rent out the farm.

Conclusions

Farm operators' expectations about the importance of off-farm income to their future is most obvious among the young operators. Multiple-job holding among some young farm households is viewed in the traditional light as a steppingstone to full-time farming. However, many others view multiple-job holding as a

How to Interpret the Figures

Figures I-1, I-2, and I-3 display the responses of farmers through the use of estimated probability distributions. Each curve shows the age distribution for one possible response to the question. The area under each curve is one. The highest point, or peak, of the distribution is called the mode. The mode represents the farmer's age with the highest probability of occurrence. The median age is marked by a circle. Fifty percent of the farmers are younger than the median and fifty percent are older than the median.

way of life in the near future. Many older operators expect to retire gradually by not engaging in off-farm job activities and scaling back their operations.

Nearly two-thirds of all operators do not expect the size of their operation to change in the near future. Not too long ago, farm expansion was touted as a major goal of many farmers and seen as the most reasonable course for staying in farming. In contrast, the attitudes described here show that many farmers hope to maintain the current size of their operation and earn supplemental income—which often exceeds their farm income—at off-farm employment.

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² Operators can also acquire the use of capital, and share the returns from production, from those outside of the operation or the sector, such as landlords and contractors.

Figure I-1

Of those who expected to be only farming, small-farm operators were older than large-farm operators

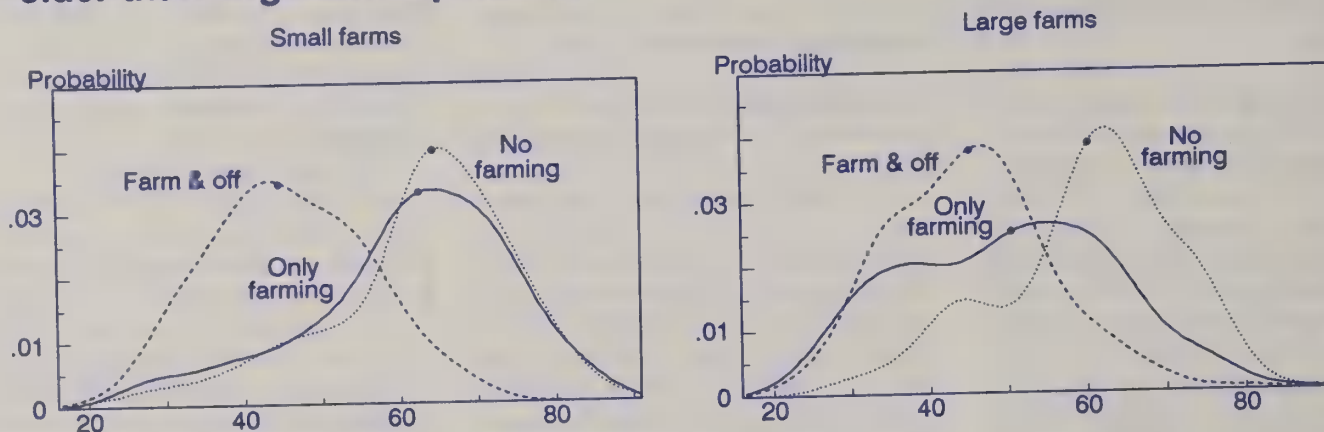


Figure I-2

Operators who expected to increase their farm size were likely to be young

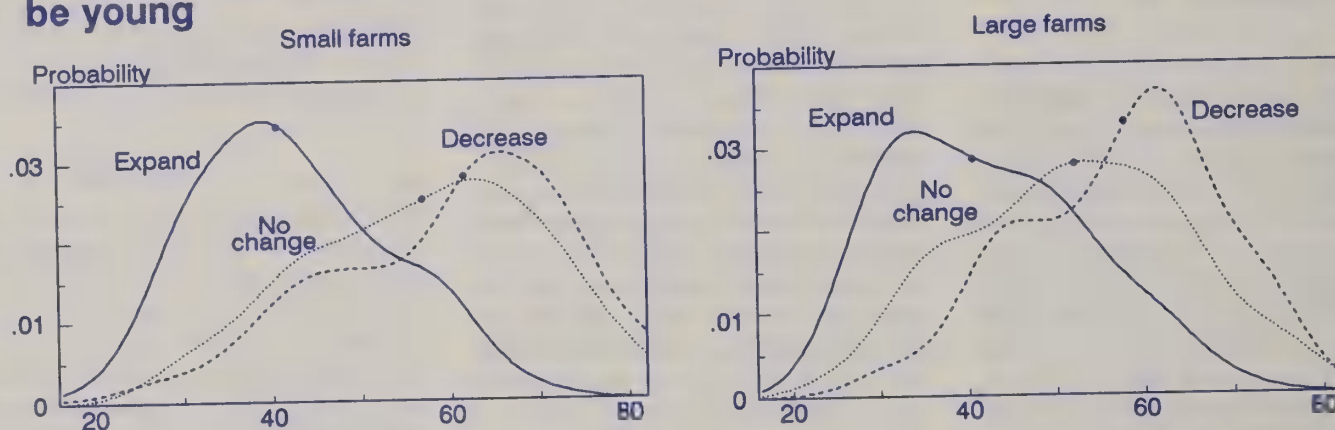
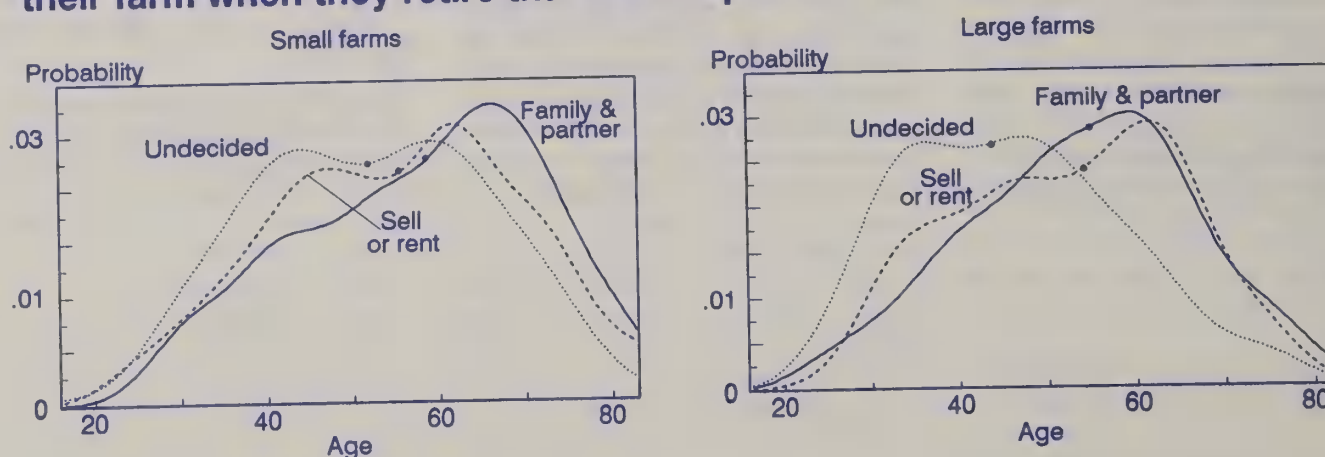


Figure I-3

Youngest operators were more likely to be undecided about the future of their farm when they retire than older operators



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Appendix table 1--Farm income, assets and debt, and returns, 1987-92

Item	1987	1988	1989	1990	1991P	1992F
Billion dollars						
Income and total returns:						
1. Gross farm income 1/	164	169	185	190	185	186 to 190
2. Wages and perquisites to hired labor	9	9	10	11	12	12 to 13
3. Other operating expenses, excluding interest	80	84	89	92	90	90 to 94
4. Capital consumption	15	15	16	16	16	15 to 17
5. Net income from assets and operators' labor and management (1-2-3-4) 2/	60	61	71	72	67	65 to 69
6. Income imputed to operators' labor and management	24	25	26	29	30	28 to 32
7. Residual income to assets (5-6)	35	36	44	43	36	34 to 38
8. Real capital gain to assets	21	10	-19	-27	-15	-16 to -20
9. Total return from assets (7+8)	57	46	26	16	21	16 to 20
10. Interest paid	15	14	14	14	14	12 to 14
11. Real capital gain to debt	7	3	6	7	4	3 to 5
12. Total return to equity (9-10+11)	49	37	18	9	12	8 to 10
13. Real capital gain to assets and debt (8+11)	28	15	-13	-20	-11	-12 to -16
14. Residual income to equity (12-13)	21	22	30	29	23	21 to 25
Balance sheet: 3/						
15. Assets	773	805	820	835	845	850 to 860
16. Debt	144	139	137	137	138	136 to 142
17. Equity (15-16)	628	666	683	698	708	710 to 720
Percent						
Rates of return and interest rates:						
18. Rate of return on assets (ROA) (7/15)	4.8	4.5	5.5	5.2	4.3	4 to 5
19. Real capital gain on assets (8/15)	2.8	1.3	-2.3	-3.2	-1.8	-2 to -3
20. Total real return on assets (18+19)	7.6	5.8	3.1	2.0	2.5	2 to 3
21. Av. interest rate paid on debt (10/16)	9.6	10.0	10.3	10.1	9.8	9 to 10
22. Real capital gains on debt (11/16)	4.6	3.7	4.4	4.8	2.9	2 to 3
23. Real cost of debt (21-22)	5.0	6.3	5.8	5.3	6.9	6 to 7
24. Rate of return on equity (ROE) ((7-10)/17)	3.6	3.3	4.5	4.2	3.3	3 to 4
25. Real capital gain on equity ((8+11)/17)	4.7	1.4	-1.9	-2.9	-1.6	-2 to -3
26. Total real return on equity (24+25)	8.2	5.7	2.6	1.3	1.6	1 to 2
27. Net return on assets (NROA) (18-21)	-5.0	-5.6	-5.0	-5.2	-5.5	-5 to -6
28. Spread (20-23) 4/	2.5	-0.5	-2.7	-3.4	-4.4	-4 to -5

P = preliminary, F = forecast. Numbers may not add due to rounding. 1/ Excludes operator dwellings.

2/ Numbers in parentheses indicate components required to calculate a given item. 3/ Excludes operator households and CCC activity. 4/ When total real rate of return on assets exceeds total real cost of debt, debt financing is profitable.

Appendix table 2--Farm income and cash flow statement, 1987-92

Item	1987	1988	1989	1990P	1991F	1992F
Billion dollars						
Farm income sources:						
1. Cash receipts	141.8	151.1	160.9	170.1	168	163 to 171
Crops 1/	65.8	71.6	76.8	79.4	83	80 to 85
Livestock	76.0	79.4	84.1	89.6	85	82 to 87
2. Direct Government payments	16.7	14.5	10.9	9.3	9	8 to 11
Cash Government payments	6.6	7.1	9.1	8.4	8	8 to 10
Value of PIK commodities	10.1	7.4	1.7	.9	1	0 to 1
3. Farm-related income 2/	6.6	6.3	8.1	6.7	7	6 to 8
4. Gross cash income (1+2+3) 3/	165.0	171.9	179.9	186.0	183	179 to 188
5. Nonmoney income 4/	5.6	6.1	6.1	6.3	6	5 to 7
6. Realized gross income (4+5)	170.6	178.0	186.0	192.3	189	184 to 195
7. Value of inventory change	-2.3	-3.5	4.3	2.9	1	1 to 6
8. Total gross income (6+7)	168.4	174.5	190.3	195.1	190	189 to 197
Production expenses:						
9. Cash expenses 5/ 6/	109.8	114.5	120.5	124.2	126	125 to 132
10. Total expenses	128.7	133.9	140.2	144.3	146	146 to 154
Income statement:						
11. Net cash income 1/ 6/						
Nominal (4-9)	55.3	57.4	59.4	61.8	58	52 to 57
Deflated (1982\$) 7/	47.8	47.3	47.0	47.0	42	36 to 42
12. Net farm income 1/						
Nominal (8-10)	39.7	40.6	50.1	50.8	44	40 to 46
Deflated (1982\$) 7/	33.8	33.5	39.6	38.7	32	28 to 34

P = preliminary, F = forecast. Totals may not add due to rounding. 1/ Includes net CCC loans. 2/ Income from custom work, machine hire, farm recreational activities, forest product sales, and miscellaneous sources.

3/ Numbers in parentheses indicate components required to calculate a given item. 4/ Value of home consumption of farm products and imputed rental value of farm dwellings. 5/ Excludes depreciation and hired labor perquisites. 6/ Excludes farm households. 7/ Deflated by the GNP implicit price deflator.

Appendix table 3--Relationship of net cash to net farm income, 1987-92

Item	1987	1988	1989	1990P	1991F	1992F
Billion dollars						
Gross cash income	165.0	171.9	179.9	186.0	183	179 to 188
Minus: Cash expenses	109.8	114.5	120.5	124.2	126	125 to 132
Equals: Net cash income	55.3	57.4	59.4	61.8	57	52 to 57
Plus: Nonmoney income:						
Gross rental value of dwelling	4.9	5.4	5.5	5.5	6	5 to 7
Value of home consumption	.8	.8	.7	.7	1	0 to 1
Value of inventory change	-2.3	-3.5	4.3	2.9	1	1 to 6
Minus: Noncash expenses:						
Depreciation & accidental damage	16.7	17.1	17.6	17.5	18	16 to 20
Labor perquisites	.5	.5	.5	.5	1	0 to 1
Minus: Household expenses 1/	1.7	1.8	1.7	2.1	2	1 to 3
Equals: Net farm income	39.7	40.6	50.1	50.8	44	40 to 46

P = preliminary, F = forecast. Totals do not add due to rounding. 1/ Includes expenses related to operator dwellings.

Appendix table 4--Cash receipts, 1987-92

Item	1987	1988	1989	1990P	1991F	1992F
Billion dollars						
Crop receipts: 1/						
Food grains	5.8	7.5	8.2	7.9	7	6 to 8
Wheat	5.0	6.4	7.3	6.8	6	5 to 7
Rice	.7	1.1	.9	1.1	1	1 to 2
Feed grains and hay	14.6	14.3	17.1	19.1	19	17 to 21
Corn	9.9	8.9	11.4	13.7	14	13 to 16
Sorghum, barley, and oats	2.1	2.2	2.3	2.0	2	1 to 3
Hay	2.5	3.1	3.4	3.4	3	2 to 4
Oil crops	11.3	13.5	11.9	12.4	12	11 to 13
Soybeans	10.0	12.1	10.5	10.9	11	10 to 12
Peanuts	1.0	1.1	1.1	1.3	1	1 to 2
Cotton lint and seed	4.2	4.5	5.0	5.2	5	4 to 6
Tobacco	1.8	2.1	2.4	2.7	3	2 to 4
Fruits and nuts	8.1	9.2	9.3	9.3	12	10 to 13
Vegetables	9.9	9.8	11.5	11.5	12	10 to 13
Greenhouse & nursery	6.8	7.1	7.6	8.1	9	8 to 9
Other crops 1/	3.4	3.7	3.8	4.0	4	3 to 5
TOTAL CROPS	65.7	71.6	76.8	80.4	83	79 to 84
Livestock receipts:						
Red meats	44.5	46.5	46.9	51.7	50	44 to 53
Cattle and calves	33.6	36.8	36.9	39.7	38	35 to 40
Hogs	10.3	9.2	9.5	11.5	11	11 to 12
Sheep and lambs	.6	.5	.5	*	*	0 to 1
Poultry and eggs	11.5	12.9	15.4	15.3	15	14 to 16
Broilers	6.2	7.4	8.8	8.4	8	7 to 9
Turkeys	1.7	2.0	2.2	2.4	2	2 to 3
Eggs	3.2	3.1	3.9	4.0	4	3 to 4
Other poultry	.4	.4	.5	.5	*	0 to 1
All dairy products	17.7	17.6	19.4	20.2	18	17 to 20
Other livestock	2.3	2.4	2.5	2.5	3	2 to 3
TOTAL LIVESTOCK	76.0	79.4	84.1	89.6	85	82 to 87
TOTAL RECEIPTS	141.8	151.1	160.9	169.1	168	163 to 171

P = preliminary, F = forecast. * = less than \$500 million. Totals may not add due to rounding. 1/ Includes sugar, seed, and other misc. crops.

Appendix table 5--Farm income distribution by enterprise type, 1990-92 1/

Item	Crops					Livestock			
	Total crops	Cash grain 2/Tobacco	Cotton	Fruit/nut/vegetable	Total livestock	Red meat	Poultry and eggs	Dairy	
Thousands									
Number of farms:									
1990	884	460	76	19	93	1,259	1,042	12	197
1991	873	454	75	19	92	1,243	1,029	12	195
1992	862	449	74	19	91	1,228	1,016	12	192
Income:	Billion dollars								
1. Cash receipts--									
Crops									
1990	73.3	32.0	2.5	5.1	20.0	6.1	4.6	*	1.1
1991	76.8	31.3	2.5	5.3	23.0	6.0	4.5	*	1.1
1992	76	31	2	5	23	6	5	*	1
Livestock									
1990	6.6	4.9	0.2	0.1	0.1	83.1	47.3	13.6	20.7
1991	6.3	4.6	*	*	*	78.9	45.5	13.5	18.6
1992	7	4	*	*	*	78	45	13	19
2. Direct Government payments--									
1990	6.1	4.5	0.1	0.8	*	3.2	2.1	*	1.0
1991	5.6	4.0	*	0.7	*	2.9	1.9	*	0.9
1992	6	5	*	1	*	3	2	*	1
3. Gross cash income-- 3/									
1990	89.3	42.9	2.8	6.3	20.9	95.8	56.2	13.7	24.0
1991	92.0	41.7	2.8	6.4	23.9	91.4	54.2	13.5	21.9
1992	92	42	3	6	24	91	54	13	22
4. Cash expenses--									
1990	59.8	29.5	2.3	2.8	7.8	64.3	43.3	4.2	17.5
1991	61.2	30.1	2.3	2.8	8.0	64.3	43.1	4.3	17.6
1992	63	31	2.4	3	8	65	43.9	4	18
5. Net cash income--									
Current dollars 4/									
1990	29.4	13.4	0.5	3.5	13.1	31.5	12.9	9.4	6.6
1991	30.8	11.6	0.5	3.6	15.9	27.2	11.0	9.2	4.4
1992	29	11	*	3	16	26	10	9	4
Deflated (\$ 1982)									
1990	22.4	10.0	0.4	2.7	10.0	23.9	9.8	7.2	4.9
1991	22.5	8.5	0.4	2.6	11.6	19.8	8.0	6.7	3.2
1992	21	8	*	2	11	18	6	6	3
Balance Sheet 5/									
6. Farm assets--									
Real estate									
1990	272.5	138.0	10.5	7.2	57.0	341.9	274.4	2.7	62.0
1991	276.7	140.2	10.6	7.4	57.9	347.3	278.7	2.8	62.9
1992	278	162	11	7	58	349	280	3	63
Nonreal estate									
1990	93.7	56.9	3.0	3.7	10.4	126.5	88.7	0.8	35.5
1991	94.0	57.2	3.0	3.8	10.5	126.9	89.0	0.8	35.6
1992	96	58	3.1	4	10.7	130	91	1	36.4
7. Total liabilities--									
1990	67.4	38.2	2.2	3.6	7.6	69.0	44.6	0.9	22.6
1991	67.7	38.4	2.2	3.6	7.6	69.3	44.7	0.9	22.7
1992	68.7	39	2	4	7.7	70	45	1	23
8. Debt-to-asset ratio--	Percent								
1990	18	20	16	33	11	15	12	25	23
1991	18	19	16	33	11	15	12	25	23
1992	18	20	16	33	11	15	12	25	23

1990 preliminary, 1991 and 1992 forecast. * = less than \$500 million. Numbers may not add due to rounding.
 1/ Farm types are defined as those with 50 percent or more of the total value of production accounted for by a specific commodity or commodity group. 2/ Includes farms earning at least half their receipts from sales of wheat, corn, soybeans, rice, sorghum, barley, oats, or a mix of cash grains. 3/ Equals 1 + 2 + farm related income. 4/ Equals 3 - 4. 5/ Excludes farm households.

Appendix table 6--Farm production expenses, 1987-92

Item	1987	1988	1989	1990P	1991F	1991F
Billion dollars						
Farm-origin inputs	32.6	36.5	37.7	39.0	38	36 to 41
Feed	17.5	20.4	21.0	20.7	20	18 to 22
Livestock	11.8	12.8	13.1	14.8	14	12 to 15
Seed	3.3	3.4	3.6	3.6	4	3 to 5
Manufactured inputs	18.1	18.9	19.9	19.7	21	20 to 23
Fertilizer	6.5	6.9	7.2	7.2	7	6 to 8
Fuels and oils	5.0	5.1	5.2	5.0	6	5 to 7
Electricity	2.2	2.3	2.0	2.0	2	1 to 3
Pesticides	4.5	4.6	5.4	5.4	6	5 to 7
Total interest charges	15.0	14.7	14.7	14.7	14	12 to 15
Short-term interest	6.8	6.8	6.9	6.9	7	6 to 9
Real estate interest	8.2	7.9	7.8	7.8	7	6 to 8
Other operating expenses	34.2	34.4	37.5	38.7	41	40 to 45
Repair & maintenance	6.8	6.8	7.3	7.3	8	7 to 9
Labor expenses	10.0	10.4	11.1	12.5	14	12 to 16
Machine hire & custom work	2.1	2.4	2.7	2.6	3	2 to 4
Animal health	1.3	1.3	1.5	1.5	2	1 to 3
Marketing, storage & transportation	4.1	3.5	4.1	4.0	4	3 to 5
Misc. operating expenses	9.7	10.0	10.9	10.7	11	10 to 14
Other overhead expenses	28.9	29.4	30.6	31.3	32	30 to 33
Capital consumption	16.7	17.1	17.6	17.5	18	16 to 20
Taxes	4.9	4.8	5.1	5.6	6	5 to 7
Net rent to nonoperating landlords	7.3	7.4	7.9	8.2	8	7 to 9
TOTAL PRODUCTION EXPENSES	128.7	133.9	140.2	144.3	146	146 to 154
Cash expenses 1/	109.6	114.4	120.5	124.2	126	125 to 132

P = preliminary, F = forecast. 1/ Cash expenses equal total expenses minus depreciation, operator dwelling expenses, and noncash labor benefits.

Appendix table 7a--Balance sheet of the farming sector, excluding operator households, December 31, 1987-92

Item	1987	1988	1989	1990P	1991F	1992F
Billion dollars						
Farm assets	772.5	805.1	819.7	834.6	845	850 to 860
Real estate 1/	578.6	599.4	605.1	614.4	624	625 to 635
Livestock and poultry	58.0	62.2	66.2	69.1	66	68 to 72
Machinery and motor vehicles	80.0	82.0	85.8	87.4	89	88 to 92
Crops stored 2/	17.8	22.7	23.3	22.4	23	20 to 24
Purchased inputs	3.0	3.3	2.7	2.8	3	2 to 4
Financial assets 3/	35.1	35.4	36.6	38.5	40	39 to 43
Farm debt	144.4	139.4	137.1	136.5	137	136 to 142
Real estate 4/	82.4	77.6	75.3	73.4	73	72 to 76
Nonreal estate	62.0	61.7	61.8	63.1	64	63 to 67
Total farm equity	628.1	665.8	682.6	698.2	708	710 to 720
Percent						
Selected ratios:						
Debt-to-asset	18.7	17.3	16.7	16.4	16.2	16 to 17
Debt-to-equity	23.0	20.9	20.1	19.6	19.4	19 to 20
Debt-to-net cash income	260.9	242.9	230.7	220.8	234.6	240 to 250

P = preliminary, F = forecast. 1/ Excludes value of operator dwellings. 2/ Non-CCC crops held on farm plus value above loan rate for crops held under CCC. 3/ Excludes time deposits and savings bonds. 4/ Includes CCC storage and drying facility loans.

Appendix table 7b--Balance sheet of the farming sector, including operator households, December 31, 1987-92

Item	1987	1988	1989	1990P	1991F	1992F
Billion dollars						
Farm assets	911.4	956.8	976.0	996.2	1010	1,015 to 1,025
Real estate	658.6	687.0	692.7	702.6	713	715 to 725
Livestock and poultry	58.0	62.2	66.2	69.1	66	68 to 92
Machinery and motor vehicles	84.5	86.7	90.2	91.7	93	92 to 96
Crops stored 1/	17.8	22.7	23.3	22.4	23	20 to 24
Purchased inputs	3.0	3.3	2.7	2.8	3	2 to 4
Household goods	32.9	37.0	42.2	46.3	49	49 to 53
Financial assets	56.7	58.0	58.7	61.2	63	62 to 66
Farm debt	153.7	148.5	146.0	145.1	146	145 to 151
Real estate 2/	87.7	83.0	80.5	78.4	79	77 to 81
Nonreal estate	66.0	65.6	65.5	66.7	67	67 to 71
Total farm equity	757.7	808.3	830.0	851.1	864	870 to 880
Percent						
Selected ratios:						
Debt-to-asset	16.9	15.5	15.0	14.6	14.5	14 to 15
Debt-to-equity	20.3	18.4	17.6	17.0	16.9	16 to 18
Debt-to-net cash income	277.8	258.7	245.7	234.7	250.0	260 to 270

P = preliminary, F = forecast. 1/ Non-CCC crops held on farm plus value above loan rate for crops held under CCC. 2/ Includes CCC storage and drying facility loans.

Appendix table 8--Farm financial ratios: liquidity, solvency, profitability, and financial efficiency, 1987-92

Farm financial ratios	1987	1988	1989	1990P	1991F	1992F
Liquidity ratios:						
Ratio						
Household debt service coverage 1/	5.70	6.01	6.10	6.72	6.1	6.2 to 6.4
Farm business debt service coverage 2/	3.21	3.41	3.50	3.66	3.3	3.3 to 3.5
Debt servicing 3/	.13	.12	.12	.11	.1	.1 to .2
Times interest earned ratio 4/	3.99	4.11	4.76	4.90	4.4	4.3 to 4.4
Solvency ratios:						
Percent						
Debt/asset 5/	18.7	17.3	16.7	16.3	16.2	16 to 17
Debt/equity 6/	23.0	20.9	20.1	19.5	19.4	19 to 20
Profitability ratios:						
Percent						
Return on equity 7/	3.6	3.3	4.5	4.2	3.3	3 to 4
Return on assets 8/	4.8	4.5	5.5	5.2	4.3	4 to 5
Net farm to gross cash farm income 9/	24.1	23.7	27.9	27.3	24.0	23 to 25
Financial efficiency ratios:						
Percent						
Gross ratio 10/	66.5	66.6	67.0	66.8	60.9	61 to 63
Interest to gross cash farm income 11/	8.8	8.3	7.9	7.4	7.4	7 to 8
Asset turnover 12/	22.1	21.8	22.1	22.5	21.8	21 to 22
Net cash farm income to debt ratio 13/	46.3	50.5	53.2	55.3	49.8	49 to 51
Financial leverage index 14/						
Ratio						
Financial leverage index 14/	.75	.73	.82	.81	.75	.7 to .8

P = preliminary, F = forecast. 1/ Assesses the ability of farm sector households to repay both principal and interest. 2/ Assesses the ability of farm businesses to repay both principal and interest. 3/ Indicates the proportion of gross cash farm income needed to service debt. 4/ Shows the farm sector's ability to service debt out of net income. 5/ Shows the proportion of all assets that are financed with debt. 6/ Measures the relative proportion of funds provided by creditors (debt) and owners (equity). 7/ Measures the ability of farm sector management to realize an adequate return on the capital invested by the owner(s). 8/ Measures how efficiently managers use farm assets. 9/ The profit margin indicates profits earned per dollar of gross income. 10/ Gives the portion of gross cash farm income absorbed by production expenses (claims on farm businesses). 11/ Gives the proportion of gross cash farm income committed to interest payments. 12/ Measures the gross farm income generated per dollar of farm business assets. 13/ Indicates the burden placed on net cash farm income to retire outstanding debt. 14/ Indicates whether the use of financial leverage is beneficial.

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